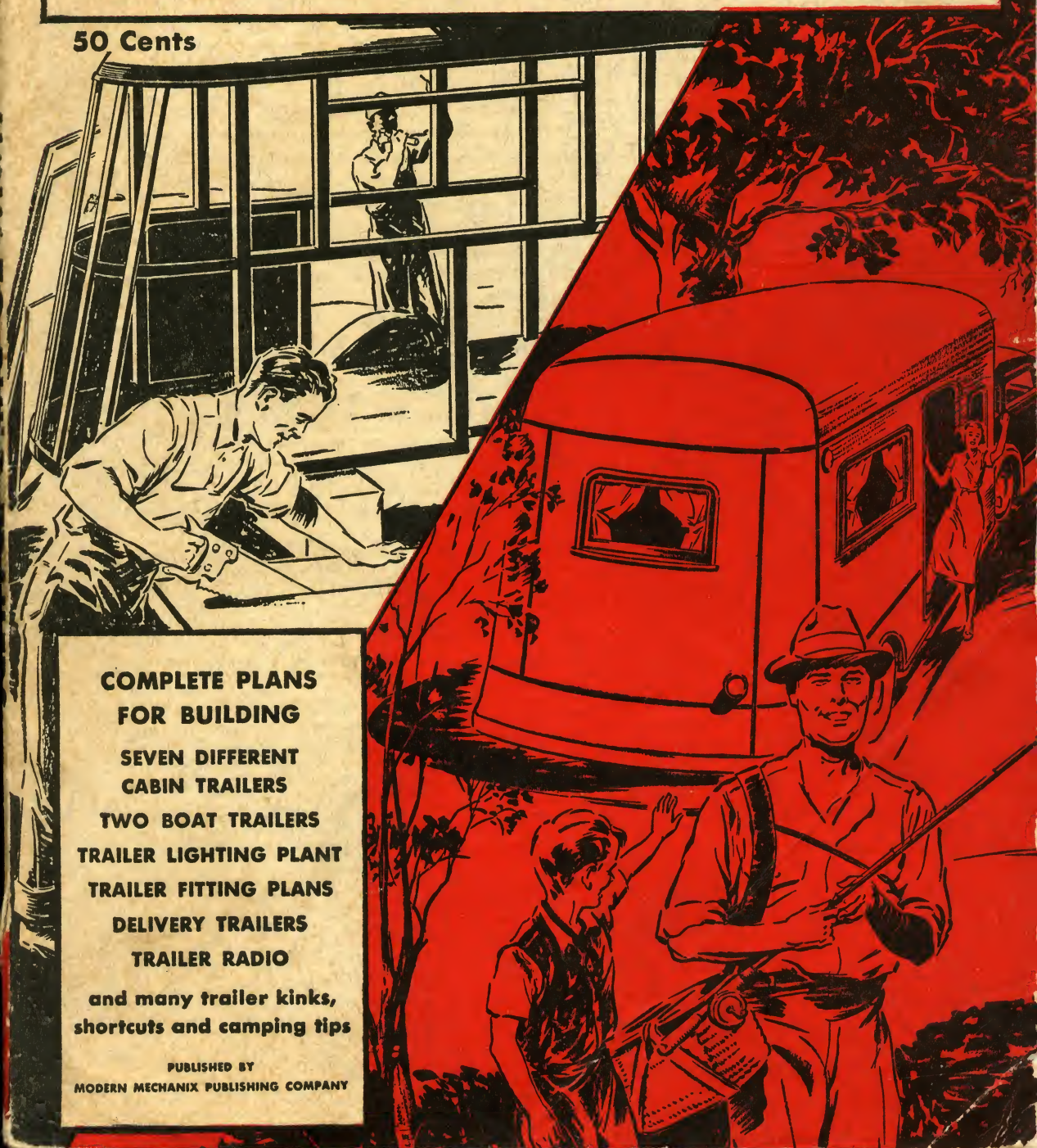


HOW TO BUILD TRAILERS

50 Cents



**COMPLETE PLANS
FOR BUILDING
SEVEN DIFFERENT
CABIN TRAILERS
TWO BOAT TRAILERS
TRAILER LIGHTING PLANT
TRAILER FITTING PLANS
DELIVERY TRAILERS
TRAILER RADIO
and many trailer kinks,
shortcuts and camping tips**

**PUBLISHED BY
MODERN MECHANIX PUBLISHING COMPANY**

HOW TO BUILD 20 Boats

—NEW EDITION—

Whether you hunt, fish, camp, or make long canoe trips, you'll find in this new and complete boat-builder's guide exactly the plan for the purpose. Outdoor life is twice as adventurous in a boat you've built yourself, and many dollars can be saved. Detailed diagrams and instructions allow you to take your pick of twenty designs, even though you have never before built a boat.

CANOE, ROWBOAT CRUISER DESIGNS FOR SPORTSMEN

This new edition contains complete plans for:

Folding Duck Boat—11 feet long, with a canvas covering over a wood frame; rolls into a compact bundle fitting running board of auto. Cost is about \$10.

Tahiti—a 30-foot ocean-going cruiser, designed by Jack Hanna. A simple ketch-rigged design with auxiliary engine, costing about \$1,000 to build.

Sunapee—a 22-foot cabin cruiser for salt or fresh water, large enough for the entire family and a few friends besides. A Model A Ford engine will push her at around 18 miles an hour.

Sunray—Sam Rabl's famous 15-foot sloop design; easy to build, fast, seaworthy, and low in cost, it is the ideal sailboat for either inland or coastal waters.

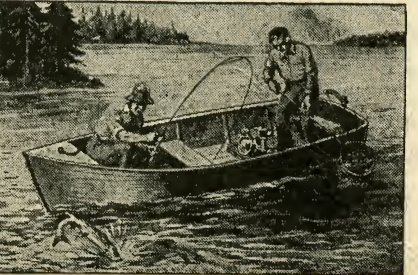
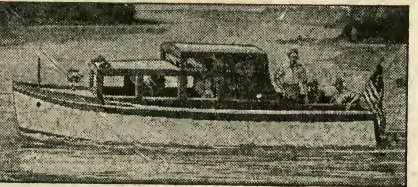
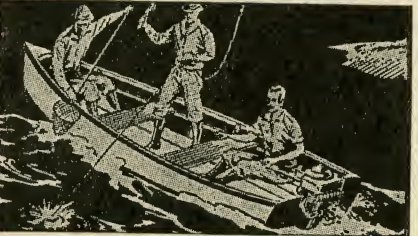
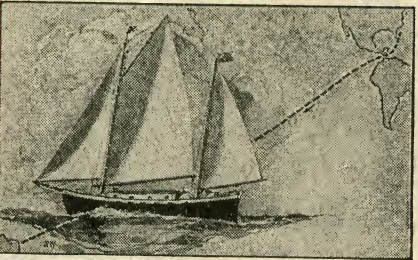
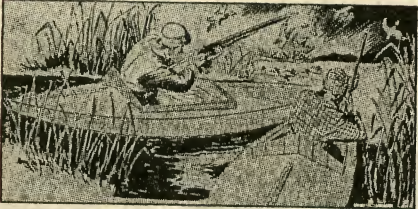
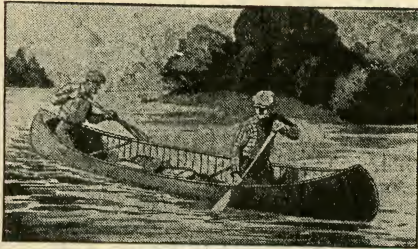
Sails—Rowboat and canoe sail plans; leeboard designs are included in the canoe sail article.

Coolwater—an 8'x18' houseboat, completely furnished, and just the thing for a private hunting or fishing headquarters in some secluded spot.

HOW TO BUILD 20 BOATS

On Sale at your Newsstand,
or order directly from
MODERN MECHANIX PUB. CO.,
Fawcett Bldg., Greenwich, Conn.

50^c



HOW TO BUILD TRAILERS

EDITED BY
THOMAS A. BLANCHARD



A Complete Manual Covering
TRAILER DESIGN, CONSTRUCTION AND FITTINGS

PRICE 50 CENTS

GREENWICH, CONNECTICUT

MODERN MECHANIX PUBLISHING COMPANY

1 9 3 7

HANDY MAN'S HOME MANUAL

NEW 1937 EDITION

No home should be without a copy of this valuable book. Contains 144 interesting pages with several hundred illustrations all in rotogravure. The new 3rd Edition of the Handy Man's Home Manual tells



HOW TO REPAIR—

Broken Furniture

The Home Radio Set

Basement Furnace

Home Plumbing

and 1000 other items for the ailing Home

HOW TO MAKE—

All-Steel Auto Trailer

World Wide Radio

Colonial Furniture

Modern Furniture

Children's Toys

and other interesting home shop projects

GET YOUR COPY NOW!

50^c

ON SALE AT YOUR
LOCAL NEWSSTAND
OR SEND DIRECTLY TO:



MODERN MECHANIX PUBLISHING COMPANY

Fawcett Publications Bldg.

Greenwich, Conn.

TABLE OF CONTENTS

How-To-Build TRAILERS

CABIN TRAILERS

RUNLITE—A Miniature Streamlined House Trailer - - - - -	18
TOURABOUT—A Full Size Panel Trailer - - - - -	26
WANDERER—One Of The Most Popular Cabin Trailers - - - - -	36
CRUISEMITE—A DeLuxe Highway Traveler - - - - -	42
COLLAPSIBLE—A Movie Star's Folding House Car - - - - -	48
ALOHA—A Bull Nosed Craft Of Modern Design - - - - -	56
ALL-PURPOSE—A Trailer Chassis For Truck Or Cabin Use - - - - -	62
BUNGALOW—A Folding Trailer That Sleeps Four Adults - - - - -	106
CABINETTE—A Construction Camp Cabin Built On Ford Chassis - - - - -	118

DELIVERY AND BOAT TRAILERS

UNI-WHEEL DELIVERY—A Single Wheeled Bumper Carrier - - - - -	34
BOAT TRAILER—Construction Is Made With Auto Parts - - - - -	68
HEAVY DUTY BOAT TRAILER—One Man Can Load 600 lb. Boat - - - - -	72
SELF LOADING FREIGHT CARRIER—Built From Auto Parts - - - - -	75
HOW TO BUILD TRUCKS—Re-Build Cars Into Serviceable Trucks - - - - -	82
BUILD A TRAILER BARGE—Converts Trailer Into Houseboat - - - - -	114

TRAILER FITTINGS

A WINDPOWER TRAILER LIGHTING PLANT - - - - -	80
A TRAILER RADIO YOU CAN BUILD - - - - -	88
FITTING YOUR TRAILER'S INTERIOR - - - - -	92
INSTALLING AUTOMATIC BRAKES IN YOUR TRAILER - - - - -	124

IT'S FREE!

MM BLUEPRINT CATALOG 1937 EDITION

Every shopman, experimenter and hobby fan will want a copy of this new edition of the Modern Mechanix Blueprint Catalog. Its forty pages are crammed full of new and interesting books, plans and workshop aids.



This New 1937 edition lists

125 Blueprint Plans

35 Technical and Hobby Books

for building Boats, Auto Trailer, Radios, Home Furniture, Models, Cabins and many other home workshop projects. Get your copy free by sending a three-cent stamp to

MODERN MECHANIX PUBL. CO.
Fawcett Publications Bldg.
GREENWICH **CONNECTICUT**

Trailer Short-Cuts

(Contents continued from page 5)

How To Install New Piston Rings - - -	13
Heat Makes Inner Tube Patches Stick - -	17
Roller Window Shade Serves As Radiator Shutter - - - - -	17
Dirt Removed From Carburetor By Racing Engine - - - - -	17
Making A Vacuum Tank For Model T Ford	17
Nitric Acid Aids In Removal Of Broken Drills - - - - -	41
Screw Jacks Support Parked Trailer - -	47
Folding Seat Forms Auto Bed - - -	55
Gasoline Stops Leaking Inner Tube Valve	55
Opening Splash Apron Cools Hot Engine	55
Hot Oil Cleans Out Gear Housing - -	55
Trailer Draw Bar Permits Carrying Lengthy Loads - - - - -	61
Handy Writing Desk Fits Over Steering Wheel - - - - -	66
Solder Lever Removes Dents From Auto Body - - - - -	66
Making A Rumble Seat Awning - - -	67
Car Battery Renews Flashlight Cells - -	67
Loudspeaker Exhaust Attached To Sports Car - - - - -	67
Steering Gear Makes Handy Shop Hoist	67
Making A Handy Grease Gun Filler - -	67
Radiator Alcohol Easily Filtered For Re-Use - - - - -	70
Kerosene Removes Water In Engine - -	70

Camping Tips For Tourists - - - - -	71
Front Wheel Alignment Reduces Tire Wear - - - - -	74
Rumble Seat Locks Without A Key - -	74
Extra Spring Adds To Car's Riding Comfort - - - - -	78
Oiling Sluggish Windshield Wiper - -	78
Bumper Guard Forms Novel Trailer Hitch	79
Torch and Kerosene Loosens Rusty Bolts -	79
Correcting Carburetor Float Leak - -	87
Removing Storage Battery Corrosion -	87
A Temporary Auto Fuse Repair - - -	87
Eliminating Auto Floorboard Squeaks -	87
An Emergency Car Locking Device - -	87
Cleaning Auto Reflectors - - - - -	87
Stopping Gas Tank Leaks - - - - -	87
Inner Tube Forms Handy Water Bottle -	87
Garage Door Chocks Save Fenders - -	101
Loosen Inner Tube Patches With Heat -	101
Quick Remedy For Sticking Auto Valves	101
Broomstick Kink Removes Broken Car Axle - - - - -	101
Switch Lights Trailer On A.C. and D.C. Current - - - - -	104
Charcoal Filters Camping Water Supply	104
Solder Repairs Worn Generator Bearings	105
Determining Polarity Of Storage Battery	105
Old Casing Adds Miles To Worn Tires -	105
Fender Flap Prevents Tire Punctures- -	105
Lock And Bolt Is Unique Trailer Hitch -	105
Sand Blast Cleans Dirty Spark Plugs - -	123
Electric Arc Pencil Brands Tools - - -	123
Micro-Test Your Car's Cylinder Oil - -	129
Tubing On Manifold Helps Car Heater -	130
Piston Pin Makes Garage Door Roller	130
Valve Aids Winter Starting - - - - -	130
Wheel Puller Made Of Old Bearing - -	130



When you and your pals gather round the campfire to watch the moon coming up across the lake, there's a real thrill in tuning in music, news flashes, or short wave calls on a portable radio—one you built yourself, with speaker, batteries and chassis snugly fitted into an ordinary fishing tackle box according to one of the many radio set plans in the



50¢

AT YOUR NEWSSTAND, OR
ORDER DIRECTLY FROM
MODERN MECHANIX PUB. CO.
Fawcett Bldg., Greenwich, Conn.

Speed Laws and Gasoline Taxes

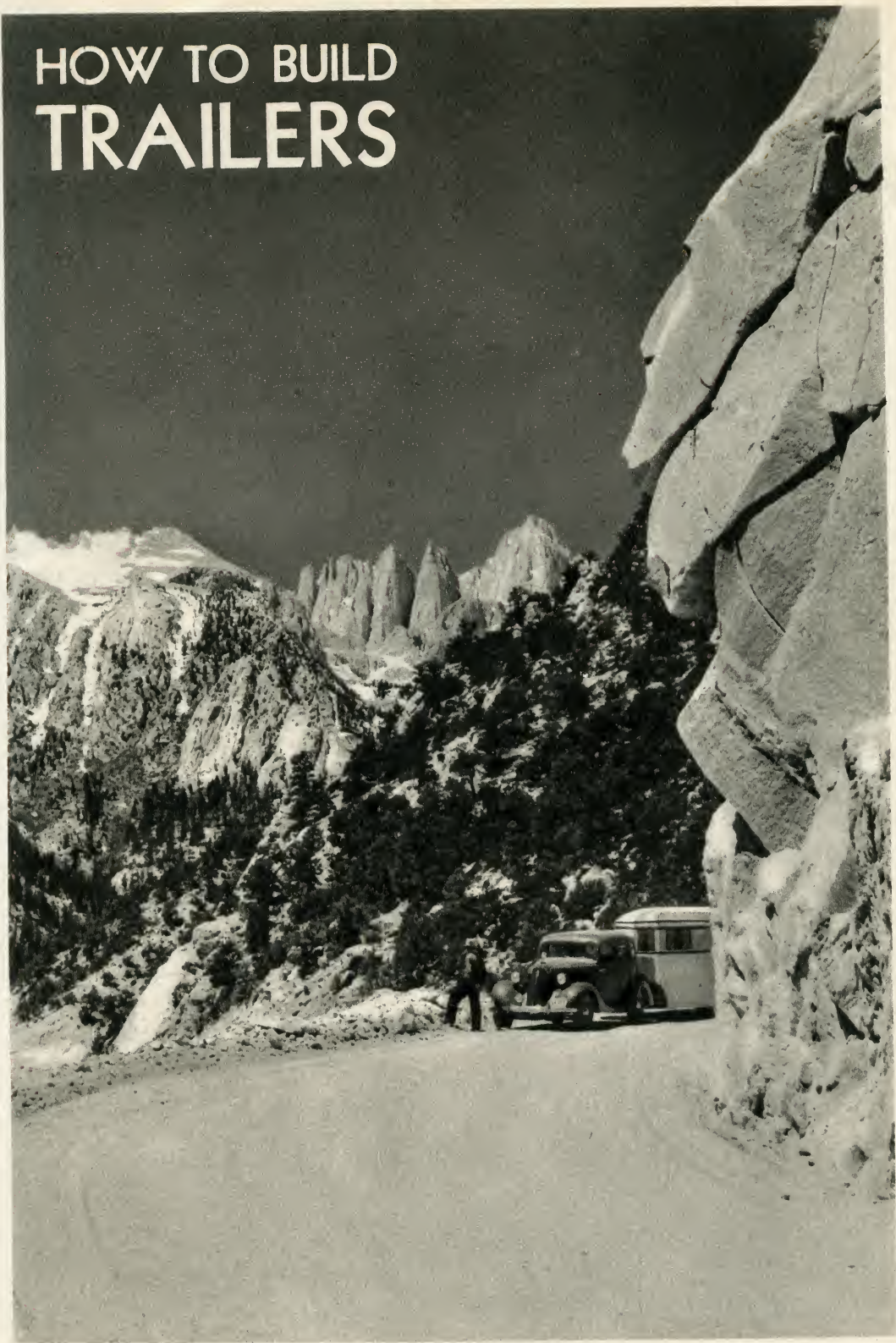
IN EFFECT IN THE UNITED STATES

(These speed laws and taxes in effect at time of publication.)

State	Speed (M.P.H.)	State Tax	Fed.	Total
Alabama	45	6		7c
Arizona	Reasonable & Proper	5		6c
Arkansas	45	6 1/2		7 1/2c
California	45	3		4c
Colorado	Reasonable & Proper	4		5c
Connecticut	45	3		4c
Delaware	45	4		5c
Florida	45	7		8c
Georgia	40	6		7c
Idaho	35	5		6c
Illinois	Reasonable & Proper	3		4c
Indiana	Reasonable & Proper	4		5c
Iowa	Reasonable & Proper	3		4c
Kansas	Reasonable & Proper	3		4c
Kentucky	40	5		6c
Louisiana	Reasonable & Proper	5		6c
Maine	35	4		5c
Maryland	45	4		5c
Massachusetts	Reasonable & Proper	3		4c
Michigan	Reasonable & Proper	3		4c
Minnesota	45	3		4c
Mississippi	40	6		7c
Missouri	Reasonable & Proper	2		3c
Montana	Reasonable & Proper	5		6c
Nebraska	Reasonable & Proper	5		6c
Nevada	Reasonable & Proper	4		5c
New Hampshire	35	4		5c
New Jersey	40	3		4c
New Mexico	Reasonable & Proper	5		6c
New York	40	4		5c
North Carolina	45	6		7c
North Dakota	50	3		4c
Ohio	45	4		5c
Oklahoma	Reasonable & Proper	4		5c
Oregon	45	5		6c
Pennsylvania	40	4		5c
Rhode Island	35	2		3c
South Carolina	45	6		7c
South Dakota	40	4		5c
Tennessee	Reasonable & Proper	7		8c
Texas	45	4		5c
Utah	50	4		5c
Vermont	Reasonable & Proper	4		5c
Virginia	45	5		6c
Washington	40	5		6c
West Virginia	45	4		5c
Wisconsin	Reasonable & Proper	4		5c
Wyoming	35	4		5c
Washington, D. C.	22 to 30	2		3c

Carry your Certificate of Registration of Ownership on your car when traveling in another state.

HOW TO BUILD TRAILERS



TOURING



Where ever the car can go, there goes the trailer home. For hunting or camping it is ideal, and the task of pulling up stakes to break camp consists of but starting the car.

There's no place like home—but when your home is in a trailer you can go where you will as free of home ties as the winds. Here is the lure and lore of the open road.

THE American gypsy spirit is building a huge new industry about the auto camp trailer. No less than 400 firms are building land yachts for auto touring.

Roger Babson, eminent statistician, declares that within 20 years over 20,000,000 people will own and use trailers.

Since there are so many trailers available, and since you, by the law of averages, are destined to become a trailer user, a few guiding principles born of experience will enable you to accurately judge the worth of a trailer design, and will forearm you with knowledge in the matter of touring a la your own "cart." The first question that arises is usually, "What is the weight and size of most trailers? Can my car handle one easily? Do they cost much to own and operate?"

The length of the average trailer is from 12 to 17 feet over all. A good average is about 15 feet. In a trailer of this size from 2 to 4 persons, with all duffle, can be comfortably housed on a tour of long duration. The weight of such a trailer will be from 1,200 to 1,800 pounds, with 1,500 pounds about the average.

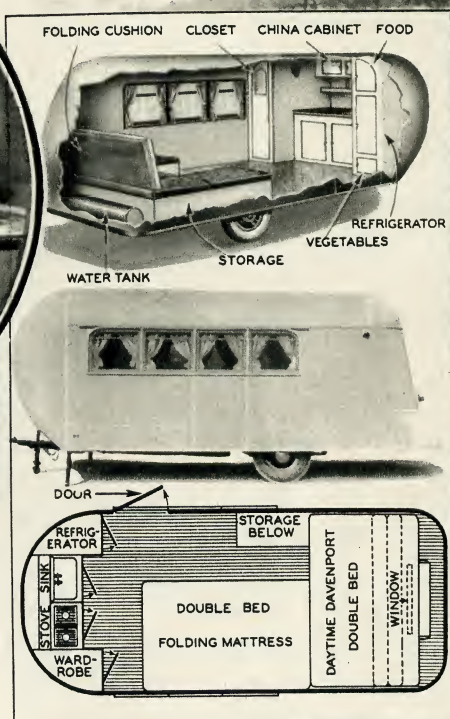
Full headroom is needed for a six-footer. This is furnished by crowning the roof well, or by constructing a "lantern" type roof similar to a street car, affording room for the head. Widths are a function of the bed length—from 72 to 77 inches. The latest trend is to use regular springs and mattresses instead of a day couch or davenport. Then no special linens are required.

The true trailer is of two-wheeled construction. It is the most popular, least

A LA CART



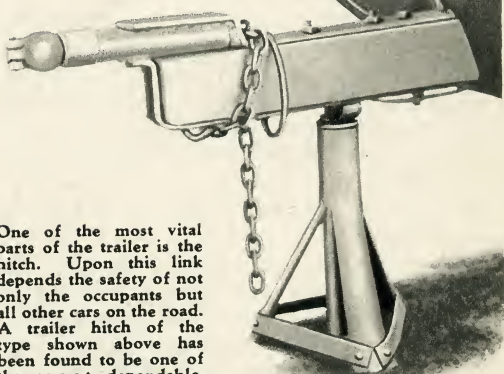
Here is an interior view of the modern Covered Wagon-trailer. Plenty of room for all your fishing tackle and other equipment is afforded by lockers placed below the folding bed.



expensive. Over an upset steel axle, two wheels are used to carry the load. A steel framework leading to a towing tongue is sprung to this axle. Upon the towing framework is erected the floor and the side pillars which constitute the body framing. All early trailers used wooden members for side framing, and this is quite satisfactory, as it is light. Usually the framework is bolted to steel channel lengths in the floor framework, making a light and rigid structure. Bodies are variously covered with dural, with pressed wood, with plywood, or with leatherette over mesh wire. Invariably an interior ceiling of light plywood is used. The air space between inner and outer walls is needed for insulation against heat and cold.

A semi-trailer type is found in the deluxe classification. This is a long trailer which imposes most of the weight on a turntable platform installed in the rumble seat of the towing car. These greater accommodations require a roadster type car, and cannot be readily detached, as the weight is about 500 pounds on the forward end. On the true-

Inside this streamlined Aladdin Trailer home one finds all the conveniences of a deluxe apartment. The cutaway section at top reveals its roomy brightness, and the floor plan below shows the arrangement of appointments.



One of the most vital parts of the trailer is the hitch. Upon this link depends the safety of not only the occupants but all other cars on the road. A trailer hitch of the type shown above has been found to be one of the most dependable. Note that extra safety is provided by a chain.

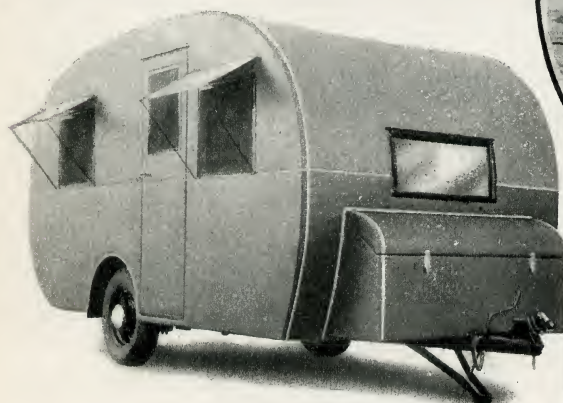
Extra Gallon of Gas Pulls Trailer 100 Miles



There is nothing gloomy or crowded about the interior of this Gilkie trailer. The plywood furnishes a light, strong method of construction, pleasing to the eye and easy to keep clean on the road.



The ocean can be brought right into your front yard when you own a trailer home. Scenes such as that above are duplicated at thousands of beaches. Left—One of newer types of trailer becoming popular..



trailer, the weights run from 125 to 150 pounds—light enough for a man to freely detach and park it in his backyard.

A ball and socket towing arm, allowing independent movement for the trailer is becoming universally used, and in some states is specified by law. Pin type yokes are to be avoided. Chains must be used as an auxiliary hitch to prevent accidents should the trailer hitch fail and the tow become wild.

Home builders of trailers usually purchase wheels, axles and have the welded frame made up for them, completing the woodwork themselves.

Tests on towing costs have resulted in the following acceptable averages: a trailer will cost 1 gallon of gas for every 100 miles towed. This presumes a light sedan used for towing, which is in good condition and not prone to using more than the normal amount of oil.

See to it that your trailer caravan has adequate locker provision for spare tire and worm jack for the trailer, a good old-fashioned kerosene lantern, tow rope, shovel, blocking boards, spare haywire, and a small kit of tools are aboard the trailer.

See to it also, in addition to the locker space required for the items mentioned above, that a sealed gurry bucket for garbage is installed which may be emptied at some fill after breaking camp.

Carry a most complete first aid kit and familiarize yourself in its use. And—this is important—carry TWO fire extinguishers.

Another matter is the water. The best tank is a seamless steel tank, with handhole plates for cleaning, and which has been tinned inside. This keeps water safe and furnishes an ample supply for long runs.

How To Install New PISTON RINGS



Below: Ring is held in small vise having copper or leaden jaw clips, and metal removed from edges with thin flat file until correct ring gap clearance is obtained when the ends of ring are aligned.

Scrape out carbon deposits from bottom of each piston groove, then fit each ring to its groove by rolling around as shown at left. Mark ring and groove similarly. There should be no up and down motion of ring in groove.



Rings are dressed down on fine emery cloth laid over plate glass or planed hardwood surface. Rings are slipped off pistons with hacksaw blade skids, replaced with skids in same manner, bottom ring first. Above: Using adjustable type piston ring compressor to put piston back.

IF THE oil consumption of your automobile is all out of proportion to the number of miles you drive, and the engine has poor compression, worn or faulty piston rings are undoubtedly the trouble-makers. In any car, rings will wear down gradually to the point where it is economical to replace them after about 25,000 miles of driving. This work is not at all hard, and can be done by anyone who is able to take an engine apart and put it together again.

Old rings are removed with skids made by grinding the teeth off old hacksaw blades. One end of the ring is pried out of the piston groove, and three of these skids slipped under, and then pushed around to positions 120 degrees apart. The ring will now slide off easily.

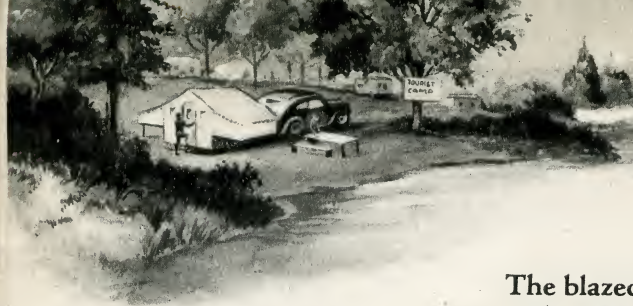
Piston rings should always be ordered .005 inches larger than the rings which previously were used. If .015 oversize rings were installed at the last overhaul, order .020 oversize rings this time.

The rings must first be fitted to the grooves

in order to check for proper clearance at all points. Fit each ring for a particular groove, dressing down on emery cloth laid over a surface plate or piece of plate glass until the ring will roll free all around the piston.

The next step is to fit the rings to their respective cylinders. Place each in turn in the cylinder block, and try to insert the thinnest blade of a feeler gauge between the ends of the ring. If this cannot be done when the ends are aligned, dress off enough with a fine file to give a clearance between the ends of from .012 to .015 inches for the top ring, .006 to .008 inches for the middle ring, and .004 to .005 inches for the lower ring.

With the rings fitted to the pistons and the cylinders, you are ready to install the piston assembly. A piston ring compressor, which can be made from a piece of strap iron, is used to compress each ring in turn as the piston is pushed down into the cylinder. The strap iron is bent to fit almost around the piston, and the ends bent out to form handles.



Trail Blazing

The blazed trails of the pioneers have been replaced with well marked concrete highways, and the days of the covered wagon have been supplanted by the era of camping trailers. There are no regrets. The thrill of path finding is as alive today as ever, and it can be enjoyed to the full in a rolling home. Before starting, read these rules and regulations.



The sunny outdoors is the kitchen for these veteran trailer fans. Right—Rolled under a shady tree by a quiet stream this trailer serves as "home" for this group of modern Nomads.



IN THE South the trailer season is in full swing, with the homes-on-wheels being parked in choice locations near the rolling surf or in quiet, well provided and protected tourist camps. In the North catalogues and plans are being consulted, or the old trailer is being checked over in preparation for one of the greatest camping seasons in motoring annals.

It is estimated that the number of camping trailers has been tripled since 1929, making a total of approximately 60,000 now on the road. In New York figures show that the number of pleasure trailers has been doubled since 1932, while in California, of the 82,100 trailers registered with the state, it is estimated that 20 per cent are attached to pleasure cars.

Many claim that this growth has been caused by the depression, that many are building camping trailers to escape the high rents. This is refuted, however, by the growing number of rolling palaces, many of which cost more than a home, and the thousands of travelers who, tired of the monotony of hotel life, seek the friendly companionship of

the tourist camps or the privacy of a secluded lake or woods.

Now what about the legal restrictions on camping trailers? Here again the prospective tourist finds nothing but encouragement and sincere welcome. Common sense is the law of the road, and as this law operates for the safety of the tourist as well as the motoring public in general, its rulings should be welcomed.

Many states have placed no restrictions on the length or width of camping trailers, but as the camper can never tell when he might feel the urge to visit a state that has, it is well to comply in advance with laws of that state.

Here are the trailer dimensions which will prove acceptable in every state: Maximum length—30 feet; height—12 feet, 6 inches; width—8 feet; weight when empty—1,500 pounds. Keep your trailer inside these dimensions and be welcome everywhere.

Safety precautions demand that the trailer should not weave from side to side but must track with the drawing vehicle. The trailer tail light must be of the brightest red possible. These laws are strictly enforced.



With A Trailer

Last, and by far the most important, are the laws concerning the trailer hitch. Here again common sense dictates the laws, and the states are quick to enforce them. Aside from the hitch or draw-bar connecting car and trailer, there must be two chains, one on each side of the coupling, and each chain must be strong enough to pull the trailer with a maximum load. This is a protection against a possible break or loosening of the draw-bar. See that your trailer is so equipped.

The practice of connecting the trailer to the rear bumper of the car is accepted in some states, but others insist that it be attached to something stronger. Here again it is best to play safe.

Neat, compact, perfectly tracking trailers are seldom stopped anywhere. The ramshackle trailers of the "box car" type, weaving from side to side, are open to severe criticism, and are often ordered from the roads as a menace.

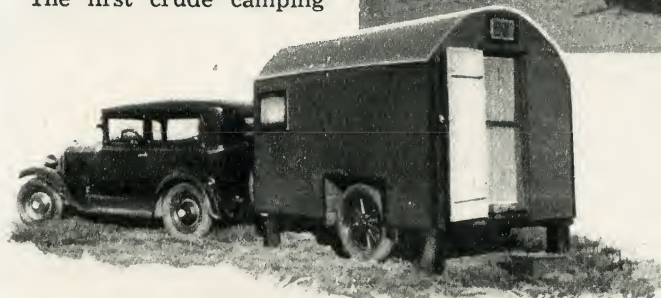
Because of the great difference in the registration requirements in each state, it is well for the tourist to stop in the first city beyond the state line and register his car and trailer. Most states require that this be done within 10 days. In New Jersey one must register at once, and in Idaho within 48 hours. There is no charge for registration, and after this has been done, the motorist is permitted to remain in the state for periods varying between 30 days to one full year, depending on the state, without additional licensing other than from the home state.

The first crude camping

trailers to make their appearance on the roads constituted a real menace. Flimsy trailer hitches would break on an up-grade, releasing the trailer to wreck destruction on anything below. The whipping side sway of some of them made them dangerous to pass, while the heavy framework and improper weight distribution frequently made the drawing car uncontrollable.

It was at that time that some states began to place severe restrictions upon camping trailers. However, such regulations were soon altered with the improved design and safety features of the new models. The income brought into the state by trailer campers was another reason for the hasty revision of laws. Tourists were not slow in demonstrating their independence by avoiding states not prepared to welcome them, and the merchants were quick to come to the defense of the campers. Now most municipalities are equipped with fine facilities for caring for camp-trailer devotees.

The 1936 camp trailer, whether manufactured or home built from approved plans, is in no way to be confused with ordinary



Above—The abrupt front on this trailer tends to catch the wind, making it harder to pull on the highway. In camp, however, this fault becomes a merit as it provides more room. Left—A home-built trailer showing the result of poor plans. This trailer is not only hard to pull because of its wind resistance, but its lack of balance puts an additional strain on the car. It is well to remember that it is just as easy to build a trailer from good plans as from poor plans. A poorly-built, homemade trailer is often more costly than good factory-built types.

BEFORE TOURING CONSULT THESE STATE REGULATIONS

camping. Nearly all will be wired for electric lights, most of them will carry plumbing for attachment to running water, and all will have conveniences rivaling those found in a kitchenette apartment. In fact, many designers of small apartments could take lessons from the trailer builders in making the utmost of limited space.

Though the space inside is limited, there is no limit to the hills and lakes and streams outside, and that is why the camping trailer is here to stay.

Following is a summary of the length of time in which a visitor may remain in each state without additional licensing:

The following states permit visitors to remain in the state for one full year, provided all the rules previously described are abided by, and proper registration has been made—New York, North Carolina, Delaware, Ohio, Nevada, Iowa, Nebraska, California, Connecticut, New Hampshire, Vermont, Illinois, Wisconsin, Pennsylvania, Kansas, Florida, In-

diana, Utah, and Oregon. Maine, unlimited.

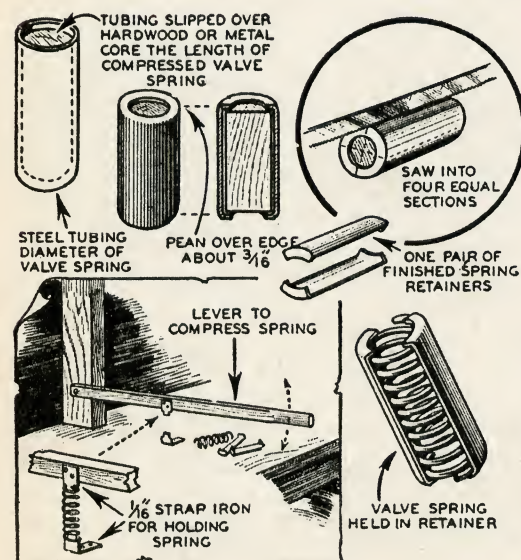
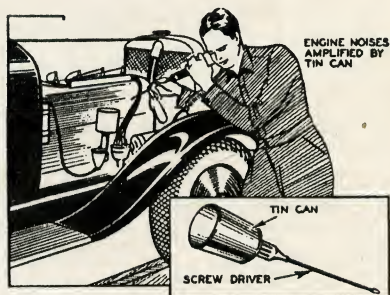
The following states permit visitors to remain untaxed for the same length of time as residents of that state are permitted to remain in the visitor's home state—District of Columbia, Missouri, Kentucky, Massachusetts, Rhode Island, and Alabama.

Visitors can remain 6 months in Virginia, 145 days in Texas, and 90 days in Arkansas, West Virginia, Wyoming, North Dakota, South Dakota, New Mexico, Michigan, Maryland, New Jersey, Idaho, Washington, South Carolina, and Minnesota. In Mississippi, Arizona, and Louisiana the visitor can remain 120 days, and 60 days in Oklahoma, while in Tennessee, Colorado, Georgia and Montana, the limit is 30 days, with extensions granted in most cases.

When the visitor obtains gainful employment in a state, in most cases he loses his non-resident status, and must obtain a car license from the state in which he is employed.

Auto Engine Noises Located With Screwdriver

WITH this simple device the sounds made by various parts of an automobile engine can be isolated and listened to. Troubles due to worn valve springs, loose timing gears or worn bearings are accurately spotted despite the noise of the engine. Get a long screwdriver and a tin can with one end open. Touch the screwdriver blade to the engine, rest the bottom of the can on its handle, and listen at the open end of the can.—R. Jones.



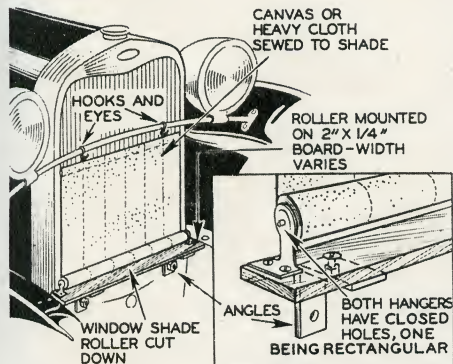
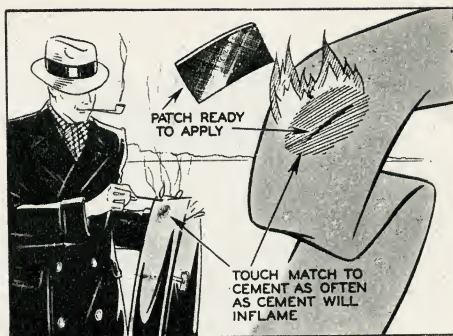
Heavy Duty Valve Spring Clamps

THE valve springs of some heavy duty motors are so stiff that a substantial spring retainer must be used when they are replaced. A simple retainer that will meet the requirements of any motor is easily made. Get a piece of seamless steel tubing which will fit loosely around the spring. Cut this to the length of the compressed valve spring, making allowance, of course, for the turned-over ledge. Slip the tube over a round iron or wood core the length of a compressed spring, and pean over the edges of the tube. Saw the tube into four quarters with a hacksaw, making two pairs of spring retainers.—Dick Cole, Los Angeles, Calif.

SIMPLE MOTORING KINKS

Heat Makes Inner Tube Patches Stick

WHEN the thermometer is hovering around zero, prepare inner tube patches in the usual manner, but touch a match to the cement as soon as it is applied. Blow out the flame immediately, and apply the match again, as often as the cement will burn. Then apply the patch quickly, and it will stick.—H. J. Olson.

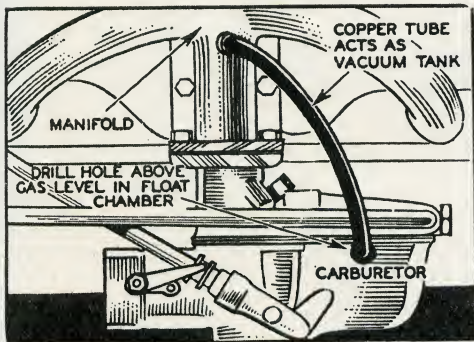
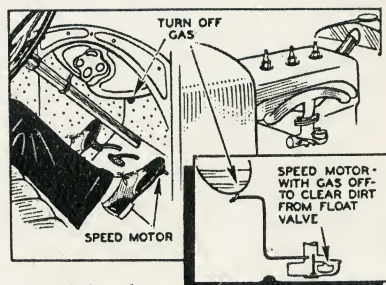


Use Roller Shade As Radiator Shutter

A CUT-OFF length of window shade on its roller makes an easily adjustable shutter for the auto radiator in winter. The shade cloth should be reinforced with a piece of canvas or heavy cloth. The spring tension keeps the cloth from flapping in the wind.—Vernon W. Palen.

Race Engine To Clear Dirt From Carburetor

WHEN dirt becomes lodged on the needle valve above the float of your auto carburetor, close the gas tank valve, then speed up the motor till gas in the carburetor is consumed. The vacuum created will usually suck up dirt particles.—J. M. Evans.

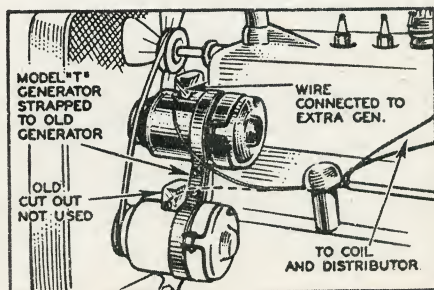


Ford Vacuum Tank

WITH gravity feed for gasoline as used on Model T Fords, it is sometimes necessary to back the car up a steep hill when the gas supply is low. By installing a copper tube between the upper part of the intake manifold and the carburetor bowl the vacuum set up by the engine pistons on the intake stroke will draw gasoline from the tank to the carburetor.—H. M. Anderson.

Temporary Repair For Damaged Generator

WHEN the generator armature on your car engine burns out, or a short circuit occurs, a temporary repair can be obtained in a few minutes simply by strapping a Model T Ford generator to your old unit, and driving it with the same fan belt as was used before. For a permanent mounting use a strap of iron.—R. Spencer.



"Runlite"—a Compact



Designed for the person who prefers a light traveling bedroom to a more commodious trailer, this lightweight streamlined modern trailer is noteworthy for its low cost and unusual safety at high speeds.

Looking into the "cabin" through the open galley hatch. "Runlite" has ample space for two full length spring mattresses. Below—Body plan dimensioned to scale.

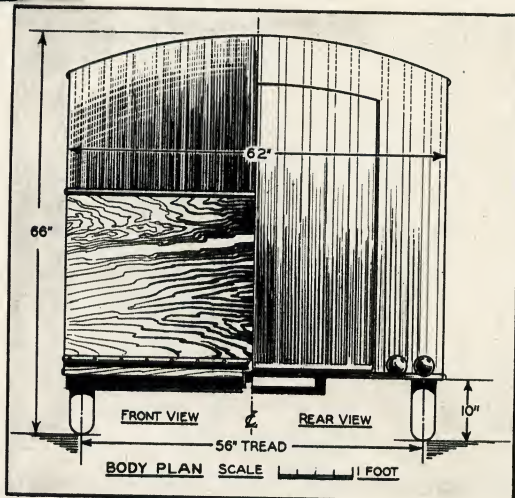
TRAILER owners incline to divide into two schools of thought; one group wanting the kind of trailer in which they can, if necessary, live permanently—the other preferring something rather lighter and more suitable for use on extended trips, such as vacations, where economy and high cruising speeds are of major importance. *Runlite* has been designed for the latter group.

By placing the wheels quite far aft it has been possible to make this an underslung job, making it directly possible to combine really effective streamlining with marked stability. The weight of the whole trailer being so low, much of the weight is carried by the tongue, a matter of no particular concern in the case of *Runlite* since it is normal for a load of 150 or even 200 pounds to be distributed on the hitch of all trailers.

Runlite can actually be towed at a 60 m.p.h. gait without straining any good light car.

Straightforward methods of construction are used in this design. There is practically no welding and absolutely no special machine work to be done. The roof, which at first glance may seem a problem, is actually simpler to construct than that of the average trailer.

Another word before starting in on the actual construction work: Comparison will reveal some slight difference between photos and drawings in this article. It is quite unim-



portant and, as far as that goes, the curves, the width and the over all height may be modified to suit the builder's requirements.

Start with the frame. What few welded joints you will have to make are encountered here. If you lack the proper equipment or experience have the welding done by an expert. The cost will be low and the sense of security a good deal greater.

Use an old Model T Ford frame. At your local junk yard these should be anywhere from 75 cents to \$2.75. Using a hacksaw, cut out a 13½" length on each side 7" from the front end. Saw out the channels to fit and

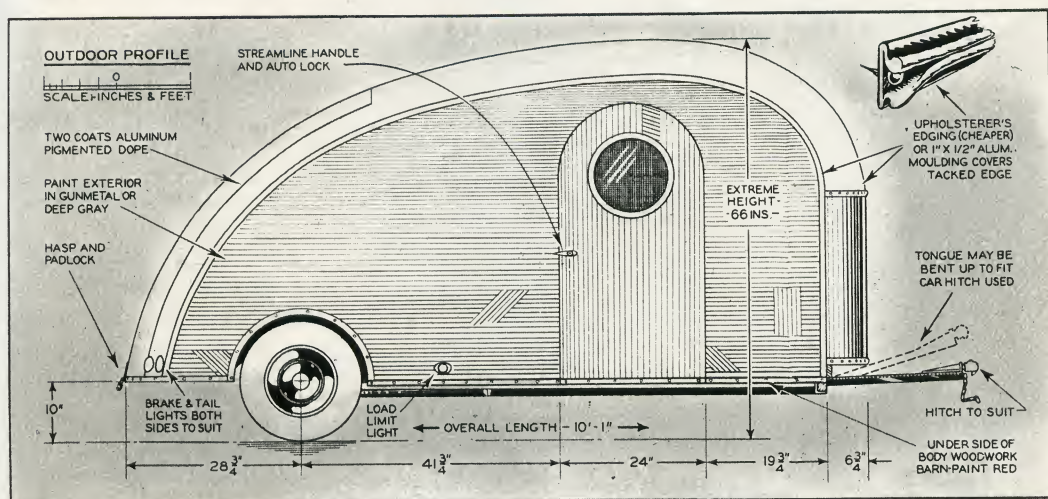
Traveling Bedroom

weld at right angles so that the frame now has a $13\frac{1}{2}$ " kick-up as shown in the drawings. An angle iron tie piece $1\frac{1}{4}" \times 1\frac{1}{4}" \times \frac{3}{16}"$ is welded across the bottom of the frame as shown in the perspective drawing of the frame. At the rear end the rear face of the spring perch is cut off with torch or hacksaw. Into the perch a $2" \times 4"$, preferably of white oak, is carefully fitted. This beam should be the full width of the body and its obvious purpose is clearly shown in the drawings. Two more lengths of Ford T frame are used for the trailer tongue and the cross-member to which it is anchored. Joints here may be either by welding or bolting. It will be necessary to cut out the filler piece for the tongue—which is bolted securely to the spring perch as well as to the channel cross piece.

Bolt or weld a standard hitch to the end of the tongue. The height of the hitch can be adjusted by heating the tongue and bending upwards.

Only four leaves of the front spring are used. A shim is put in under the perch clip bottom to compensate for the leaves removed. Second hand Model T steering tie rods are used in the manner shown for radius rods. The ball and socket fixtures for the frame end of the rods are from regular Ford radius rods. They should be welded on. The axle ends of the rods may be attached either by flattening and bolting direct to the wing spring perches, as shown, or drilled clear through the axle and bolted either side. This latter method provides an easy method of aligning the wheels.

$20" \times 4"$ wheels from a motorcycle pick-up



The profile lines of "Runlite," accurately scaled above, convey immediately grace and speed of the design. While the basic design should not be tampered with, headroom and width can be increased, if builder wishes, without harming the appearance of fast stepping trailerette.

Photograph here shows to advantage the charm small trailers of this type hold. Note excellent proportions of this vest pocket trailer—its very low-hung position, practical cooking facilities, obvious roominess. Hardly higher than small car, it sleeps and feeds two adults!



"Runlite" Constructed On Simple Steel Chassis

trailer are used. Such wheels fit Model T Ford spindles without change. They cost about \$4.00 each and the tires about the same. The completed frame, ball hitch, radius rods, wheels and tires should not cost over \$20.00 with welding included.

The steering tie rod is cut in two, the ends flattened and bolted to the axle as shown. This completes the entire chassis and the rest of the job is straight woodwork (with a little tin work here and there).

Build the floor as a foundation for the body. Second grade Oregon pine flooring, tongued and grooved, is bolted to the chassis frame starting at the rear end and working toward the towing end of the trailer. This flooring should be wide enough to finish $61\frac{1}{2}$ " wide after trimming the sides for straightness. Rabbet the first plank laid to hold the $\frac{1}{4}$ " bulkhead as shown and cut out where necessary for the spring perch at the towing end. This cut out is later covered with tin—see drawings. Lay a straightedge along the sides and saw off flush.

Next screw in the 1"x2" and 2"x2" stringers to the underside of the flooring as shown in the drawings, allowing the ends to project several inches beyond the floor at the rear. Stanchions No. 3 and the 2"x4" uprights are mortised into these projecting ends and the

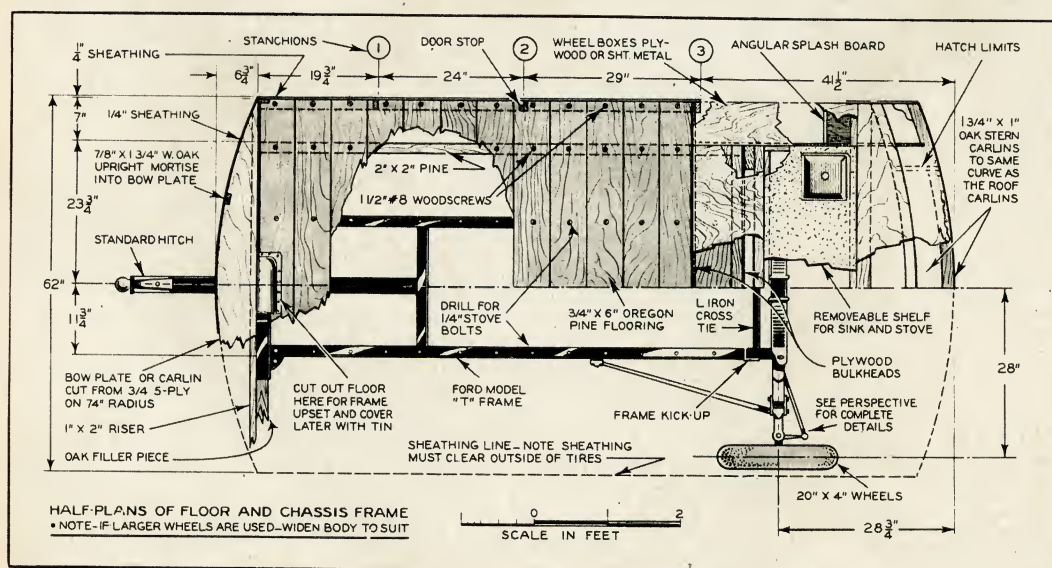
stringers trimmed off flush as shown in the detail sketches.

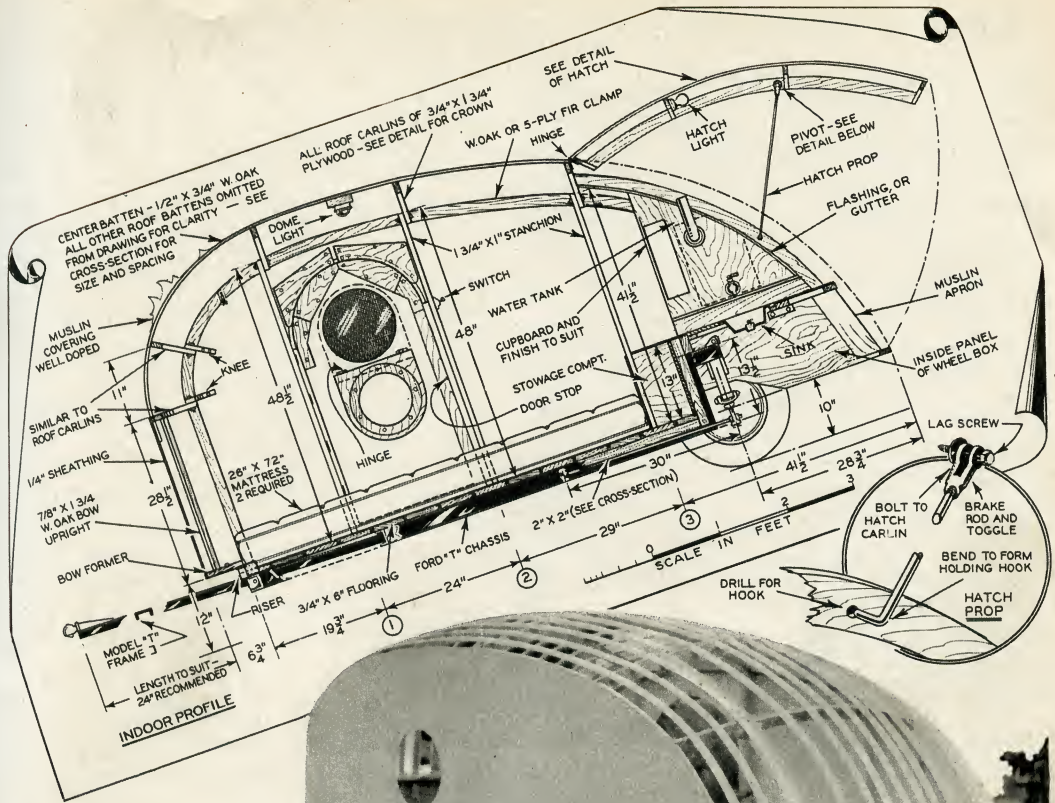
The stanchion framing can now be completed. The heels of the stanchions are boxed into the floor and bolted into the 1"x2" edge or side piece. With the main stanchions in the $\frac{1}{4}$ " plywood or hard celotex bulkheads can be installed and the boxes for the wheels built up. Framing for cupboards, water tank, sink and so forth is left until the body has been built.

Cut out the crown carlins and also the bow plate. Detail drawings give the dimensions and it will be noted that 11 carlins in all are required. Some of these are used for the roof—three being bolted to the main stanchions already installed. The remaining carlins are required for bow and stern, and for the hatch. Install the bow plate in the manner shown. It is cut on a 72" radius, is $\frac{3}{4}$ " thick and $6\frac{3}{4}$ " deep. It is screwed to the riser strip which in turn is bolted to the filler piece in the spring perch.

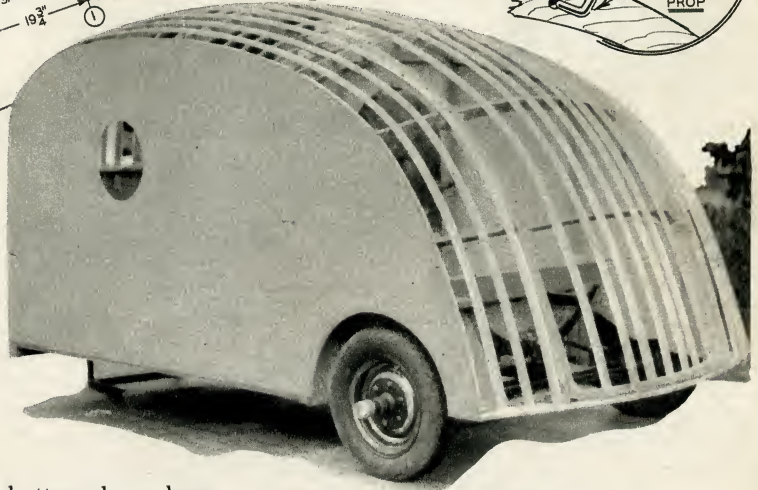
The side clamps or roof strips can now be sawed to shape and mortised into the tops of the stanchions as shown. They may be lightly screwed until the outer sheathing is applied. This sheathing, of fir plywood, $\frac{1}{4}$ " thick, or hard Celotex, is screwed directly to the stanchions, floor edges and 1"x2" outer strips. The carlins at front and back of the trailer are put in with knees as shown. Do not apply the sheathing to the front end of

These plan views of the trailer chassis and floor frame, used in conjunction with indoor profile plans on the following page (and the sectional views of the body), should be studied carefully.



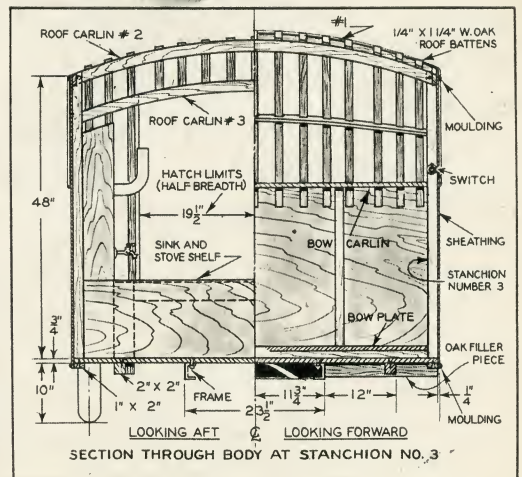


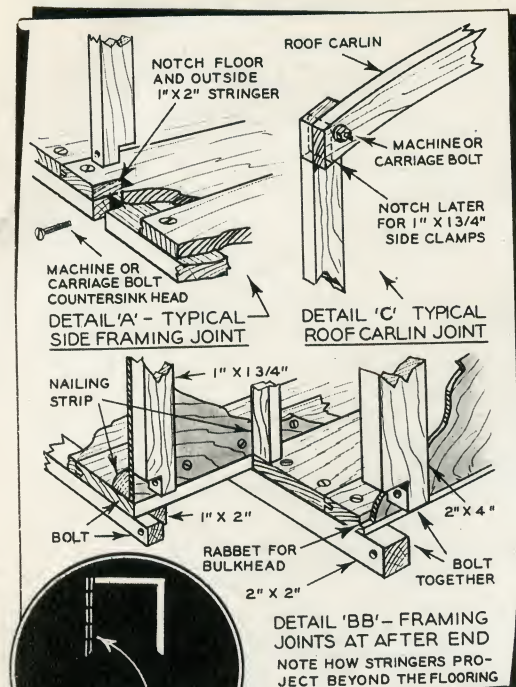
Drawing above, in conjunction with the cross-section drawing below gives many details and dimensions which will be helpful to builder. Lines for curve of roof edge should be taken off "outdoor" profile drawing, or at least checked from that plan. Completed body, ready to be covered, shown at right, will aid in reading the plans shown.



the trailer until the roof battens have been bent in. If these prove stiff, soaking for half a day under the lawn sprinkler will render them pliable. They are fastened over the carlins without notches except where they bend into the front, or bow cabin. They are notched flush into this former. Use light screws to secure the roof battens.

The lift-up cover over the galley, called a hatch in the drawings, is built up in the manner shown. The longitudinal carlins are cut to the same sweep as the roof from 3/4" plywood. Cut out four of these carlins, two of them being permanently attached to the stern portion of the body frame as shown. The other two of course form the sides of the hatch itself. A tin gutter should be hammered out and fitted along the edges of



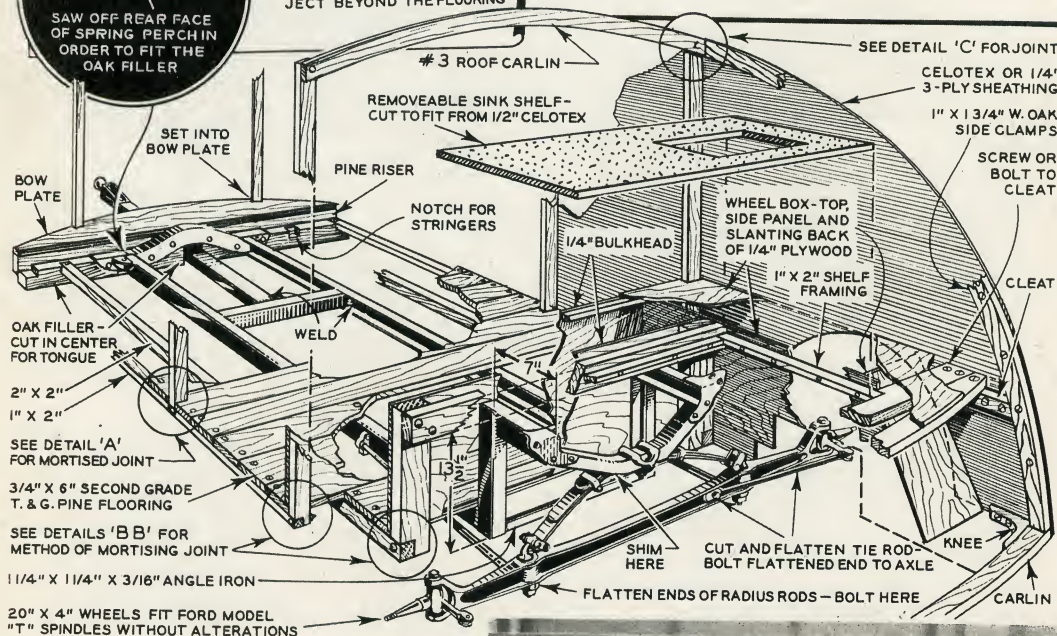


the hatch opening in the manner shown.

Attach the sheathing to the front end now. It will bend to the slight curve quite easily.

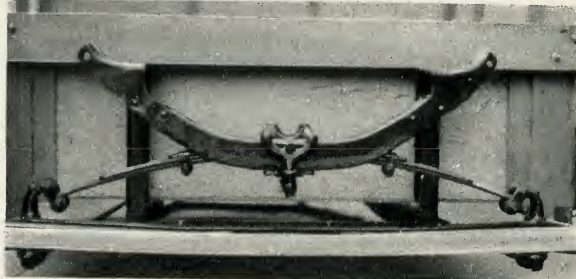
The door is clearly indicated. Lock arrangement and so on is left to the builder though a streamlined blind door handle was used on the trailer pictured. A 12" porthole is cut into the door and another one exactly opposite in the sheathing on the other side. A screen is secured to the outside of each port and inside they are furnished with hinged windows as clearly shown. Glass or airplane windshield pynalin are equally satisfactory for these windows. It has been found that the two ports provide ample ventilation for even the hottest weather.

The next step is to cover the roof. Use grade A muslin costing 18 to 24 cents a yard at most stores. Start at the front end, tacking on 1" centers with small carpet tacks, and stretch lightly over the sides as you proceed toward the rear until the tail carlin is reached. With two gallons of aluminum pigmented nitrate dope you will be able to render the



GENERAL PERSPECTIVE CONSTRUCTION DRAWING SHOWING FLOORING AND OTHER FRAMING DETAIL

This important construction drawing is not in scale but is arranged to show the general detail of the chassis, the flooring and—above—the principal stanchion joints. Note how the frame is "kicked up" in order to undersling the trailer. Note also the framing about the wheel boxes and the installation of the bulkheads and the bow plate. Study with the photo at right.



Ship Hatch Design Used In Door Construction

roof drum tight and waterproof. Correct procedure in doping cloth is to lay the first coat on around the edges and work toward the center. The edges can be finished with either aluminum edging or regular upholsterer's edging. Both are obtainable at automobile supply stores.

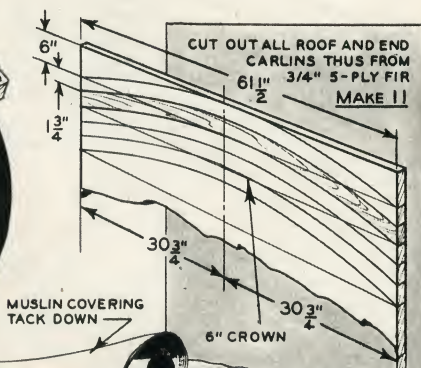
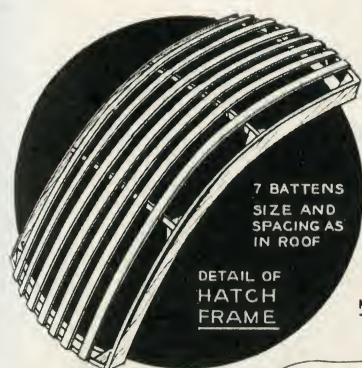
The galley is pretty thoroughly covered in the various drawings. The space formed by the two bulkheads makes a good place for odd clothes or other stowage. It extends from wheel box to wheel box, is 13" deep and about 8" wide.

Immediately aft of this compartment the sink and stove shelf is located. This shelf is made readily detachable so that the axle may be inspected if necessary or to permit the easy placing of a jack under the axle in case of flat tires.

The shelf rests on a light framing of 1"x2" pine as shown in the drawings. It



Here is an exceptionally clear picture of the simple door. It may be varied but is hard to improve for simplicity and sturdy construction. Note the blind door handle box—not shown in the drawings below.

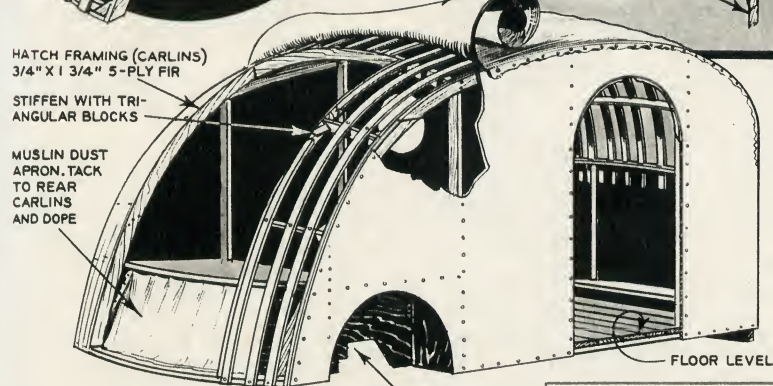


HATCH FRAMING (CARLINS) 3/4" X 1 3/4" 5-PLY FIR

STIFFEN WITH TRI-ANGULAR BLOCKS

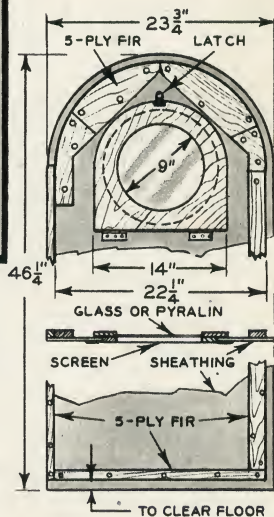
MUSLIN DUST APRON, TACK TO REAR CARLINS AND DOPE

MUSLIN COVERING TACK DOWN



BODY DETAILS - NOTE-FASTEN BATTENS AND SHEATHING BY MEANS OF LIGHT BRASS OR COPPER SCREWS

CUT OUT INSIDE PANELS OF WHEEL BOXES TO PROVIDE CLEARANCE WHERE THE AXLE PASSES THRU.



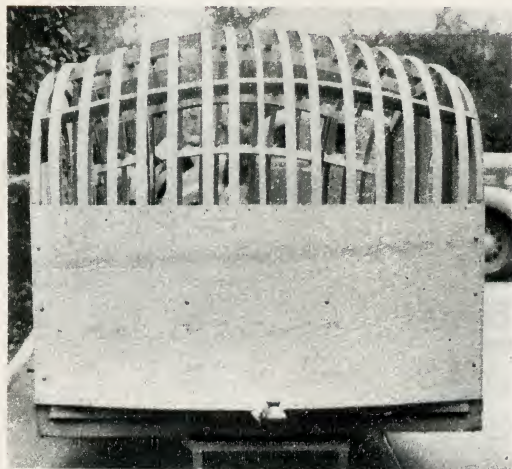
DETAIL OF DOOR SHOWING HINGED GLASS WINDOW CLOSED

RUNLITE BLUEPRINTS

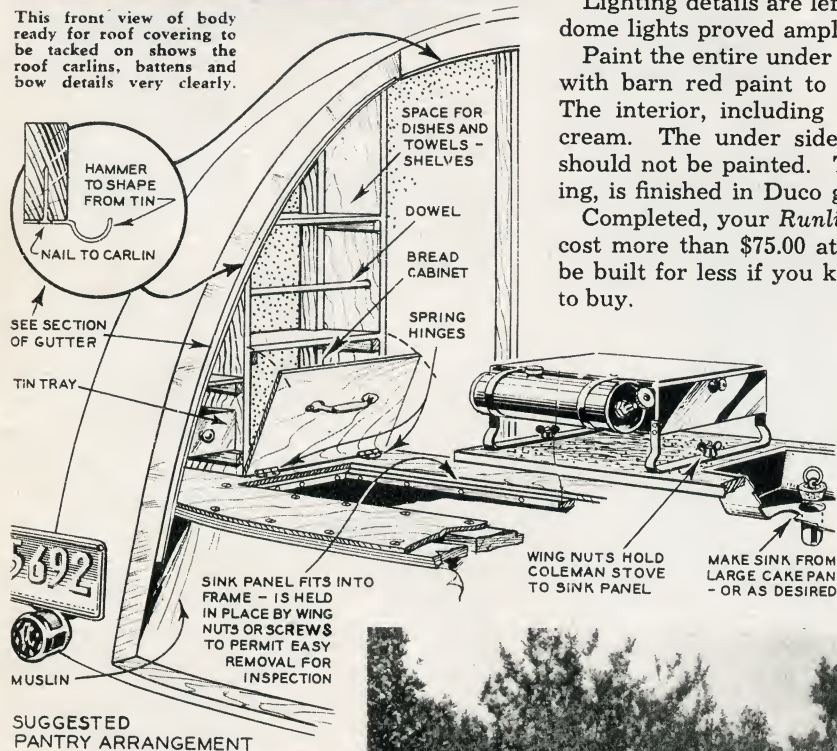
Large blueprint plans for building "Runlite" printed on tough rag content paper are available from Modern Mechanix Publ. Co., Greenwich, Conn. Order Blueprint No. T-29. Complete plans \$2.00

The roof carlins or beams are cut in the manner shown above. Galley hatch side carlins are cut to normal profile body lines.

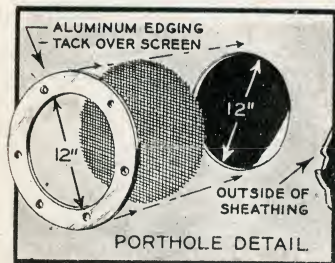
Trailer Kitchen Located In Rear Compartment



This front view of body ready for roof covering to be tacked on shows the roof carlins, battens and bow details very clearly.



SUGGESTED PANTRY ARRANGEMENT



can be held in place by a few light screws or by four wing nuts. The stove is secured to it in the manner shown and a simple sink can be made from a large cake pan and set into the shelf with small screws.

A muslin apron, tacked from shelf carlin to rear carlin and from wheel box inner panels, serves to keep the dust out. This apron should be doped.

The tank for water may be any size and the details of its installation will naturally depend upon the size used. In any case it should be so arranged as to empty directly into the sink. Cupboards and shelves may be any way you prefer. A simple arrangement as used by Mr. Trenmore Garstone, builder of the trailer illustrated, is shown in the sketches.

Lighting details are left to the builder. Two dome lights proved ample for *Runlite*.

Paint the entire under portion of the trailer with barn red paint to prevent weathering. The interior, including the floor is finished cream. The under side of the muslin roof should not be painted. The exterior sheathing, is finished in Duco gunmetal.

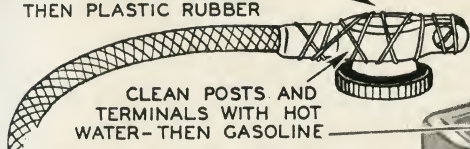
Completed, your *Runlite* trailer should not cost more than \$75.00 at the outside. It can be built for less if you know how and where to buy.

The sketch at left shows one method of fixing up the pantry side of the galley. It also shows details such as the rain gutter and the stove and sink attachment. Down below the porthole exterior is depicted. There is one port on each side in this design. Immediately below we see this dashing "air flow" trailer all set to go.

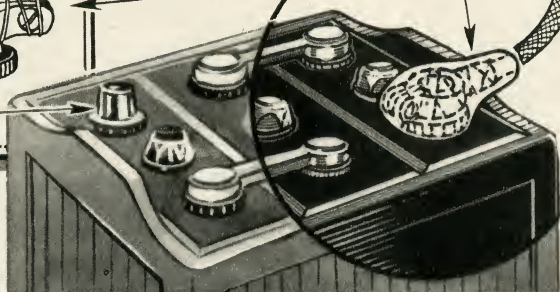


Make AUTO REPAIRS with Plastic RUBBER

WRAP WITH RUBBER BANDS—
APPLY RUBBER CEMENT—
THEN PLASTIC RUBBER

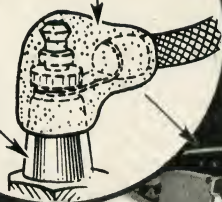


PLASTIC RUBBER

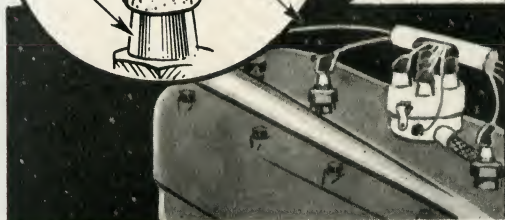


REMOVABLE
PLASTIC RUBBER
HOODS COVER SPARK
PLUG CONNECTIONS

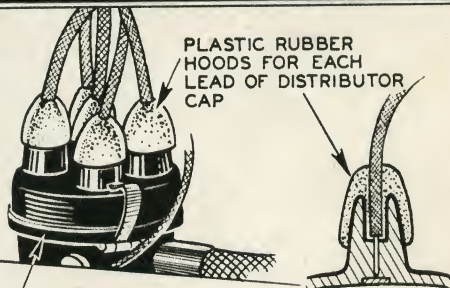
SPARK
PLUG



Many auto troubles can be prevented by timely application of plastic rubber, inexpensive material sold at dime stores in kits which include tube of cement and sandpaper. It is used extensively for repairing soles of shoes. Corrosion of storage battery terminals is effectively checked by building up air-tight, acid-proof hood over terminal posts as shown.



PLASTIC RUBBER
HOODS FOR EACH
LEAD OF DISTRIBUTOR
CAP



DISTRIBUTOR

Plastic rubber is easily molded over any clean surface, making strong, water-proof covering. Damp-weather ignition troubles are checked beforehand by building up rubber hoods over all exposed high-tension connections. Cover each spark plug, working rubber around insulation of lead wire for about one-half inch; repeat for each distributor lead. Rubber can easily be pushed off when replacing or repairing spark plugs or leads.

OTHER AUTOMOTIVE USES FOR PLASTIC RUBBER

1. GASKETS
2. WIRE INSULATION
3. FAN BELT REPAIR
4. MOTOR MOUNTINGS
5. WINDSHIELD WIPER
6. STEERING WHEEL GRIPS
7. WATER PUMP WASHERS
8. STOPS LEAKS
9. STOPS RATTLES
10. TIRE AND TUBE REPAIR

PLASTIC RUBBER USED
AS GASKET FOR RADI-
ATOR CAP



TOP REPAIR

DOOR STOP
REPAIR

ON HOOD
BEADING FOR
SQUEAKS

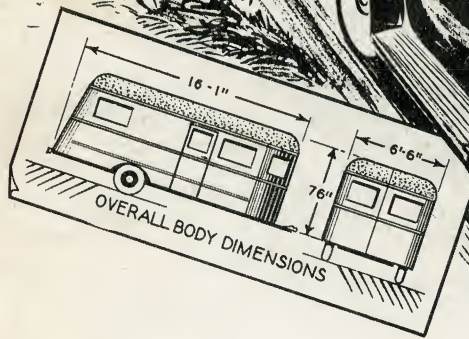
BETWEEN FRAME
AND WINDOW FOR
RATTLES

Annoying squeaks in car may be stopped with plastic rubber. If windows rattle, build up sufficiently thick layer of rubber between glass and frame to take up motion of glass. Worn door stops are built up in few minutes without removing old rubber. Plastic rubber is ideal gasket material for water system in car; follow directions carefully to insure that rubber will adhere to metal. Neat roof top repairs may be effected by spreading on thin layer of the soft rubber over cement.

BUILD "TOURABOUT" AN

Costing less than \$200 to build this economical house trailer is ideal for those whose income is limited. Wood framing throughout makes its construction very simple.

Weighing only 1,850 lbs. this commodious trailer tows easily and with little drag. A short towing hook-up adds to its towability by converting car and trailer into a six-wheel unit.



by JULIUS FANTA and
DOUGLAS P. ROLFE

HERE is a commodious trailer designed to afford home conveniences while vacationing along the highways. Light, yet sturdily constructed, this job meets the growing demand for a genuine portable home—one which not only cuts out all necessity for patronizing tourist rooms or tourist camps on long trips but also meets the requirements of those who wish to live indefinitely in their trailer home.

Besides being constructed in a simple and quite practical manner "Tourabout" has many other interesting features. Conventional in appearance, it is nevertheless unique in its low cost of construction; the practical utilization of every inch of floor space, and in having full head-room throughout.

All-wood body construction makes it easy to build for anyone handy with tools. The short towing hook-up makes it almost an integral part of the tow car and cuts out jerking and side sway to a noticeable extent. The total cost should not exceed around \$185.00 complete.

The interior space is sufficient to provide comfortable accommodations for four persons, meaning sleeping, eating and living quarters. A good standard layout is shown in the accompanying drawings but individual builders may of course utilize the floor space to suit their own conceptions of trailer comfort without upsetting the main design.

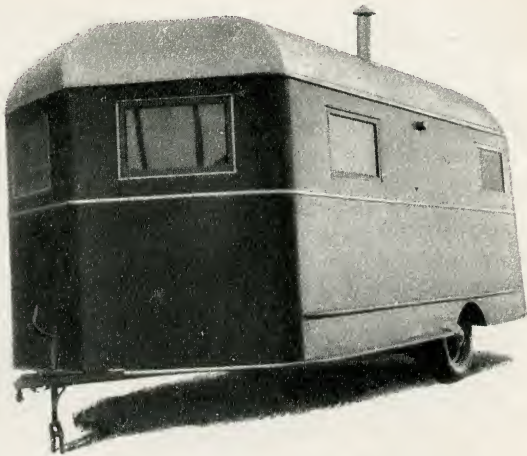
Even in spare time this trailer can be built in a surprisingly short time. Start with the platform or flooring. This is 76 inches wide and exactly 16 feet long and is built up in the

ECONOMY TRAILER HOME

manner shown. 1"x6", dress size, tongue and groove flooring is screwed with 1½" flat head screws to a framework built up substantially in the way illustrated. This framework should be of 1"x6" material also—pine will do for all but the end member which should be of oak.

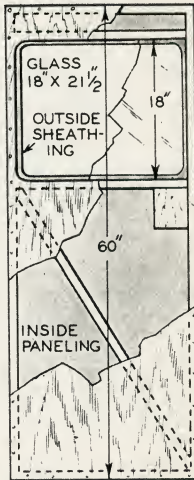
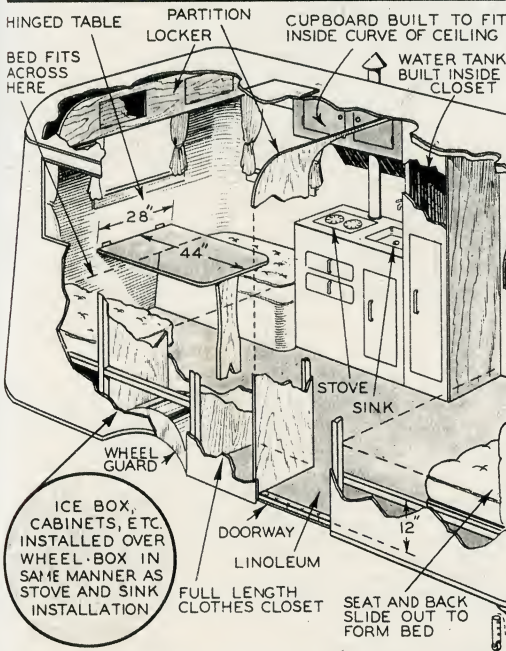
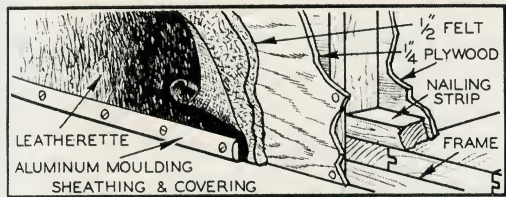
To this platform is built the body framing and to it also is attached the channel iron stringers which carry the running gear and the towing tongue. Complete the chassis first by taking two lengths of 3"x1½"x $\frac{3}{16}$ " channel iron and, after filling them with pine or—better, oak—bolt them flat side down to the under side of the platform with 5"x $\frac{3}{8}$ " carriage bolts. The channels should be spaced 46" apart, inside measurement, though this detail will depend somewhat upon what running gear you elect to buy.

The one used on the original "Tourabout"



A good view of the completed trailer ready for use.

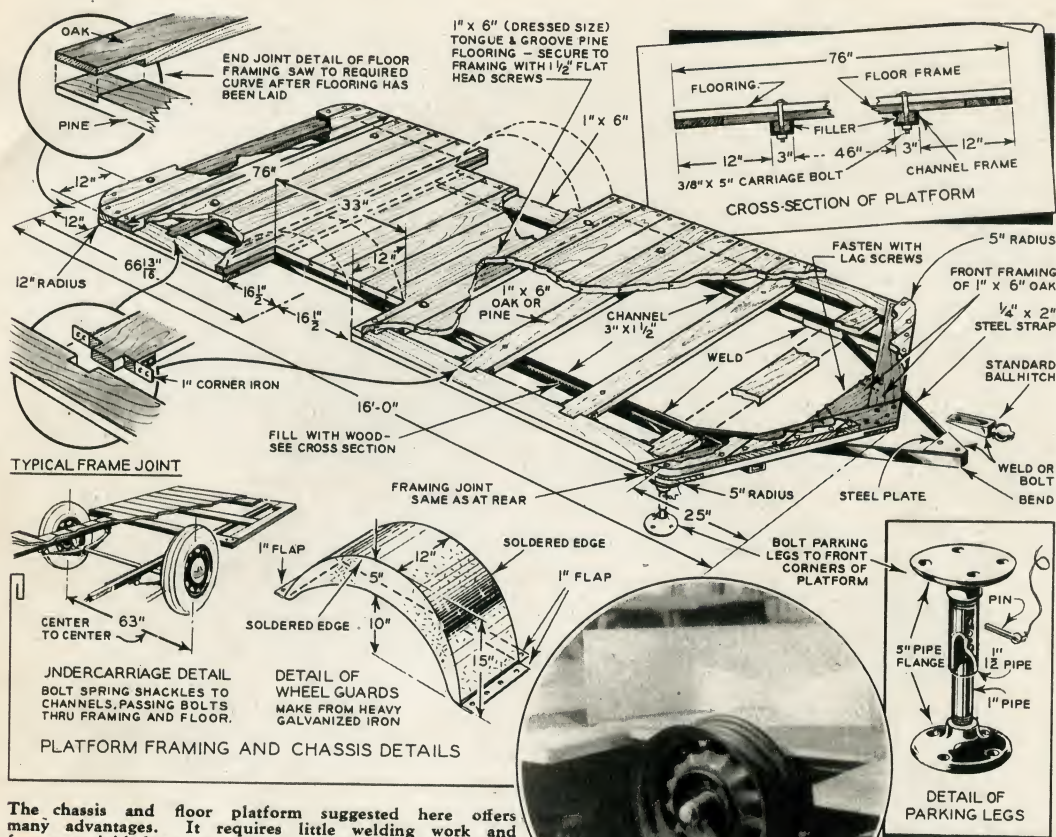
has 9-leaf springs set so the 46" measurement is exactly right for bolting the spring shackles onto the channels. In any case select a gear with balloon tired wheels that are 63 inches apart, center to center of the wheels, and bolt the shackles to the channels clear through channels, framing and floor. Cut out the wheel insets of course before attaching the running gear. The axle should be set 66 $\frac{13}{16}$ " from the platform rear end and carefully lined up before bolting down. On this single



TO FIT 24" DOORWAY
USE 1½" x 1½" ASH OR OAK FOR FRAMEWORK
INTERIOR AND EXTERIOR SHEATHING AND FINISH SAME AS FOR THE BODY

INTERIOR ARRANGEMENT PLAN FOR "TOURABOUT"

Floor Plan Details Important In Construction



The chassis and floor platform suggested here offers many advantages. It requires little welding work and forms a rigid base on which to erect the trailer body.

item the whole "trailability" of your trailer depends so—watch it!

At the forward end of the platform or chassis a length of $\frac{1}{4}$ "x2" steel strap is bent to shape and welded to the inside faces of the channels to form a towing tongue. The exact length of this steel strap can be easily determined by the builder. The hitch should be kept quite short, as the drawings indicate. The steel strap may be bolted to the channels instead of welding but the latter is preferable.

A standard towing hitch should be bolted or welded to the tongue in the manner indicated by the platform construction drawings.

Next make the wheel guards. These are made up from heavy galvanized iron with soldered edges and flanged as shown for screwing down to the platform. Paint them before mounting. Start out building the framework. The body stanchions are of $\frac{1}{8}$ "x $1\frac{1}{8}$ " ash or oak throughout. Set them into the floor, or platform, in the manner shown

and put in the stringers of $\frac{3}{8}$ "x $1\frac{1}{4}$ " stock which are mortised into the stanchions 32 inches from the floor level. Secure as shown using one and two-inch *nail-screws* as required. Brace the framework temporarily during erection.

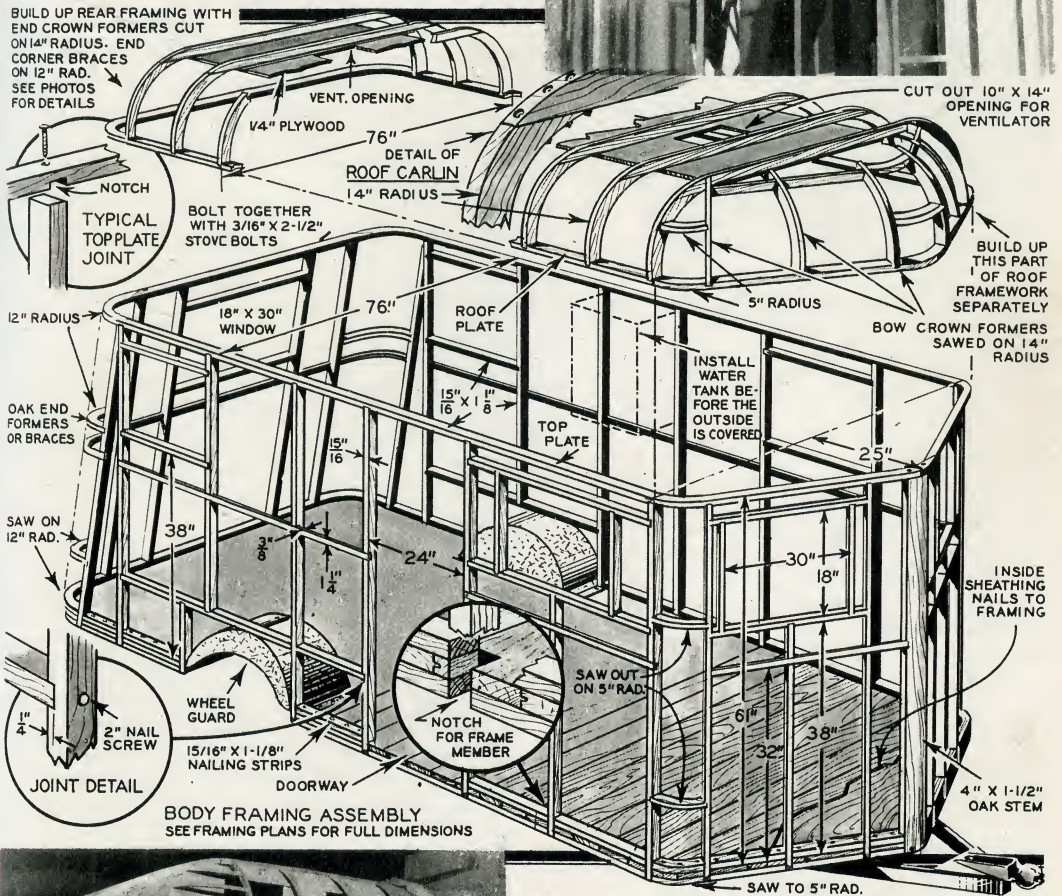
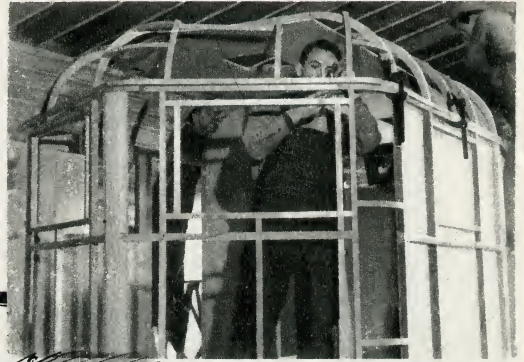
Fit in the nailing strips between the stanchions and attach the top plating in the manner shown. No gluing will be necessary if the joints are made snug. Put in the remaining side framing. The corners of the platform and body framing are rounded as shown—those at the rear end having a 12-inch curve while the front corners have a 5-inch curve where they enter the Vee. A half-round stem of $1\frac{1}{4}$ "x4" oak is set into the end of the Vee-shaped front. The entire front framing is erected *after* the side framing has been installed. The back end of the

Making The Body Frame And Roof for "Tourabout"

frame has a 10½-inch slope as the drawings show.

Before proceeding with the roof it is convenient to put in the closet walls. The disposition of these items is up to the builder but in any case the sides can be run up beyond the top plating and cut flush to the curve of the roof later.

Build the roof frame separately. It is easier to assemble it in sections on the ground.



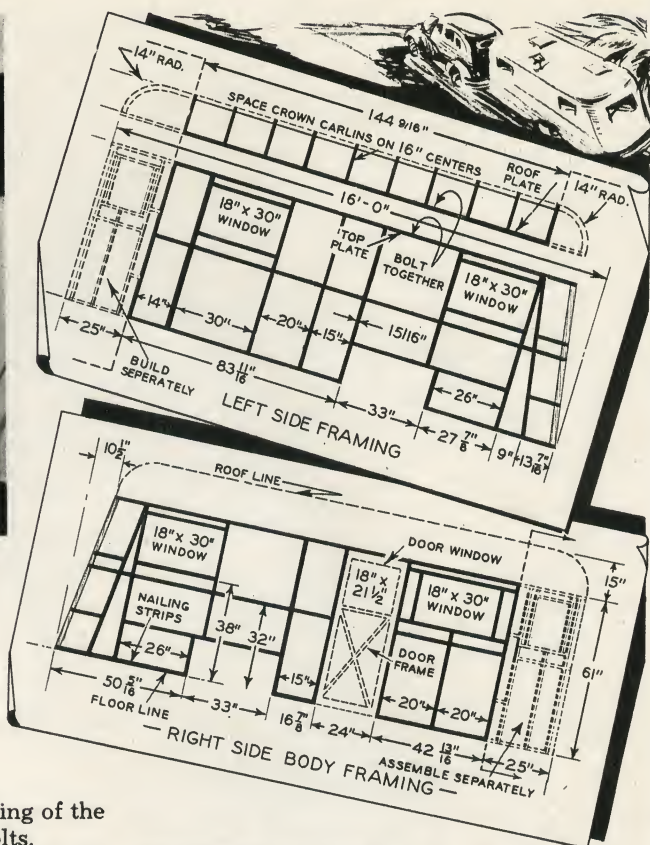
Principal dimensions of the body and roof framing are shown in the above drawing. The photograph at top gives details of the front framing which is built separately. Note the plywood ceiling in place to hold the carlins rigid. Picture at left shows details of the back end.

roof beams or carlins are constructed in the manner shown from 1½"x1½" oak or fir. Or, they may be made from ¾" 5-ply fir. The carlins are assembled 16 inches apart, center to center on the roof plating and tied at the top with ¼" mahogany plywood screwed to the underside of the beams. The entire as-

Framing Plans Simplify Building Of "Tourabout"



Before covering the sides completely with the plywood sheathing, the 23 gallon water tank should be installed. Picture above shows the tank in place high up in the framing. At right—Further details of the framing. Note that it differs on each side. Picture below shows another view of Vee front. Note the wiring leads to car battery.

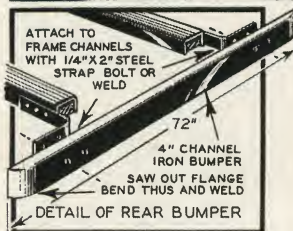


sembly is then bolted to the top plating of the body frame with $\frac{3}{16}$ "x2 $\frac{1}{2}$ " stove bolts.

All wiring and lighting fixtures should be installed at this time before the interior and exterior sheathing is applied. The water tank, with protruding intake spout should be installed high up to provide running water.

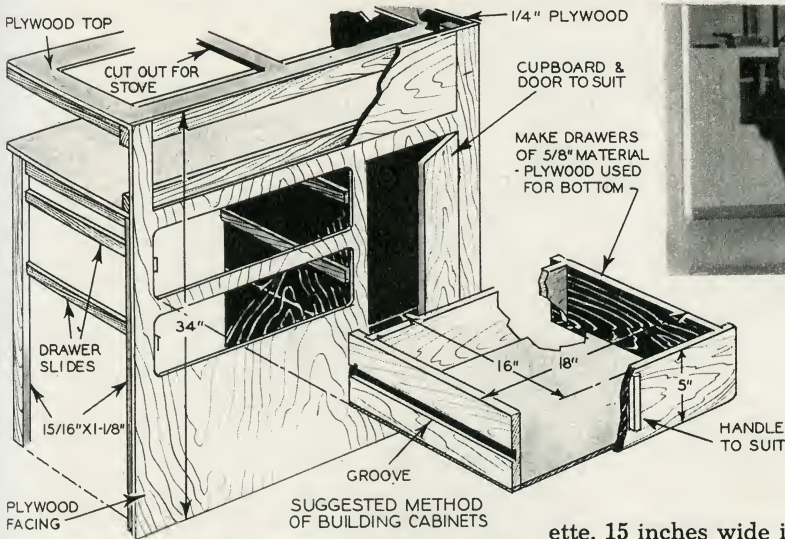
Apply the interior sheathing. This is $\frac{1}{4}$ " mahogany, or fir may be used, and is secured to the framing and the bottom nailing strips with $\frac{3}{4}$ " round head brass screws with crowned wooden washers. If mahogany is used place the finished side facing the interior. The exterior sheathing, of $\frac{1}{4}$ " fir, should be used in four by five foot sizes. It will bend over the curved corners without breaking and is fastened with $\frac{3}{4}$ " nail-screws.

It is easier to get exact window opening by covering the window space with plywood as the sheathing work proceeds and afterwards cutting out the windows along the frame lines. Install the additional roof framing at front and back and cover inside and out with sheathing. Between the second and third carlins at each end cut 10"x14" openings for the ventilators.



The "bay-window" front is popular on modern trailers. Above is pictured how the plywood sheathing is secured to the framing with nail-screws. These newly devised fastenings simplify construction and are easily driven with a hammer to make a tight joint. Left—Further construction detail.

Diagrams Suggest Interior Furnishings Arrangement



Each builder will probably have individual ideas for the interior furnishings but the sink stand shown here will appeal to many. The construction is simple.



Installing the overhead cabinets suggested in the arrangement drawing. Note how the curved back fits into the concave portion of the roof along the side.

Cement or tack a layer of $\frac{1}{2}$ " felt over the sides and cover the top down to the wall plating with a good grade of canvas. It takes about $17\frac{1}{2}$ feet of canvas to do a one-piece job and it should be laid smoothly with cement. Use a hot flatiron to smooth out the wrinkles and ensure the cement getting a firm grip.

Twenty-two and one-half yards of Leather-

ette, 15 inches wide is needed for the outside body covering. Stretch it smoothly over the felt and secure the edges with copper carpet tacks. All edges and window frames are then trimmed with $\frac{1}{2}$ " aluminum as shown.

The interior arrangements and fixtures are now attended to. These are only suggested in the drawings and can be built to suit. For lightness throughout it is sensible to build all interior cabinets, etc., of plywood fastened to light wood framing. Finish the interior woodwork by sanding down and coating with a light mahogany filler before giving it two final coats of quality varnish.

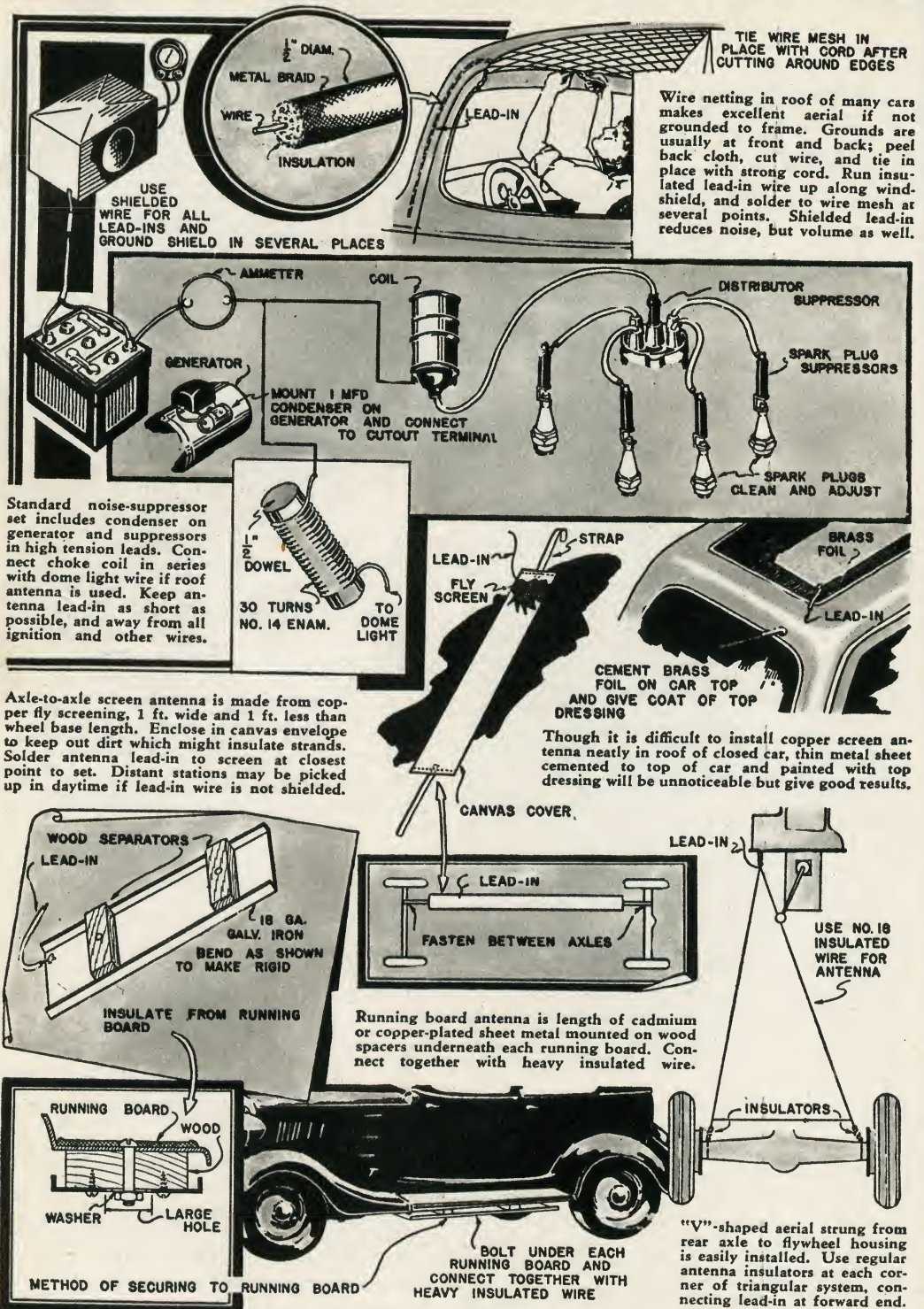
Windows and doors are not described but they are conventional in build and should be hung to open outwards.

The rear bumper, of 4-inch channel iron is secured as shown. A simple, easily extended parking leg is also shown. The flanged pipes slide out to the desired adjustment and are held in position by a pin or bolt. The lower pipe and flange, the foot, can be removed if desired when traveling.

The entire under side of the platform frame is given a thorough coating of barn red paint to protect it against weathering. The metal framework of the chassis is best coated with a good flat black enamel.

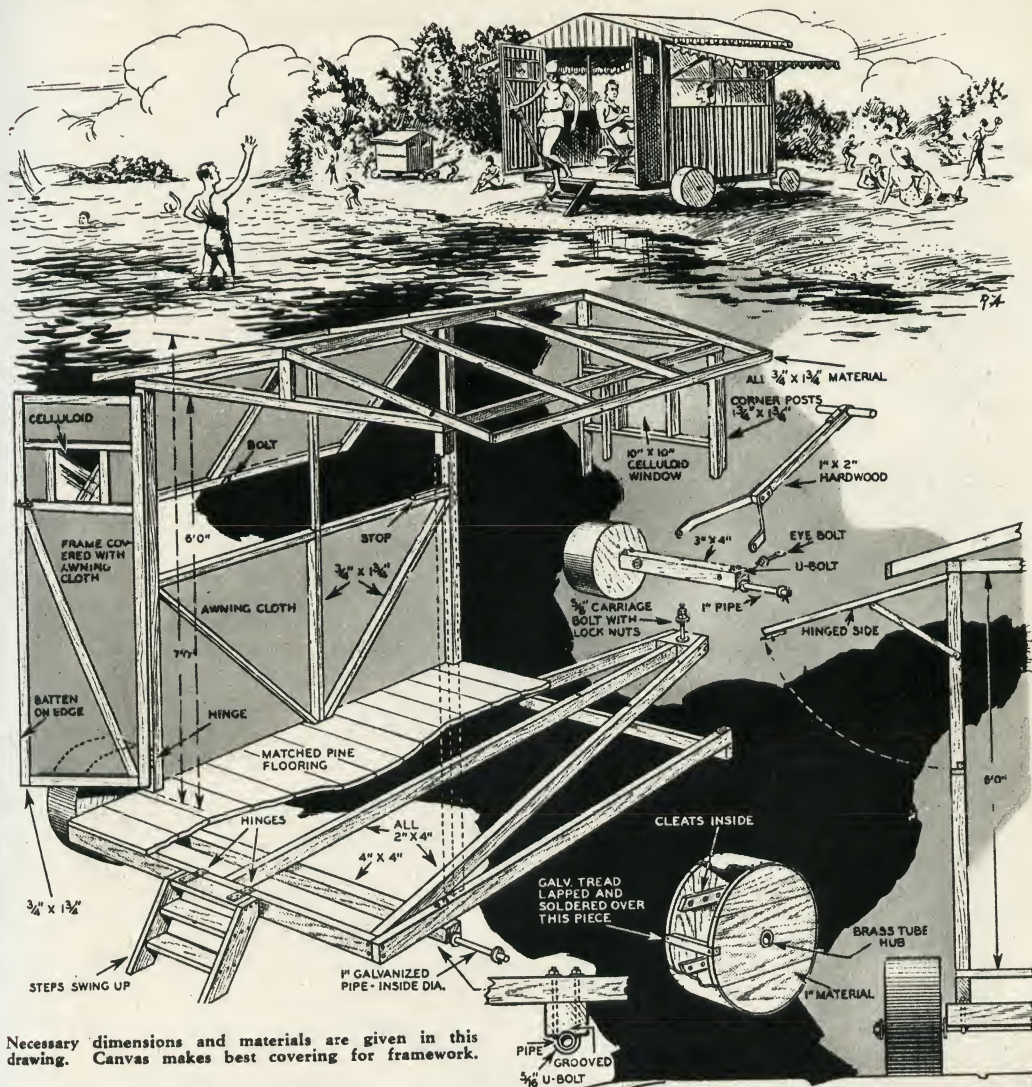
The flooring inside looks well when covered with a plain linoleum which can be obtained inexpensively and makes a wearing finish. It is a good plan to lay the linoleum over a layer of felt. This not only protects the linoleum from undue wear but serves to insulate the floor against cold.

These Simple Kinks Reduce Auto Radio Noises



Suppression of ignition noises while engine is operating is biggest problem of auto radio installation. Standard suppressor kits are satisfactory for most cars, and are easily installed. Where noise still persists, above kinks should clear up trouble.

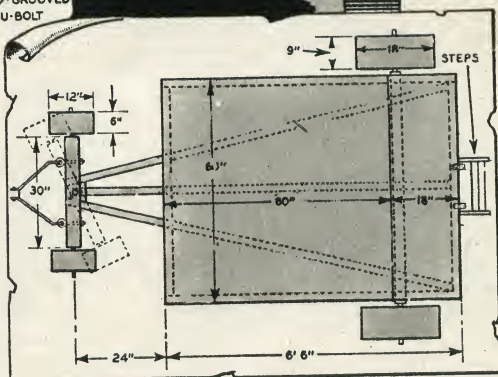
A Trailer Bath-House For Summer Sports



THIS novel trailer bath-house serves a double purpose. It can be drawn to the water's edge and used as a dressing room, or the doors can be thrown open and the sides raised to make an airy beach shelter.

All necessary constructional details are given in the accompanying drawings. Construction of the wheels calls for comment. Literally they are simply drums with a galvanized shell of wooden heads. A section of brass tubing just large enough to slip over the pipe axles serves as a hub. These should be driven into the wood discs to fit tight. Be sure they are accurately centered and true.

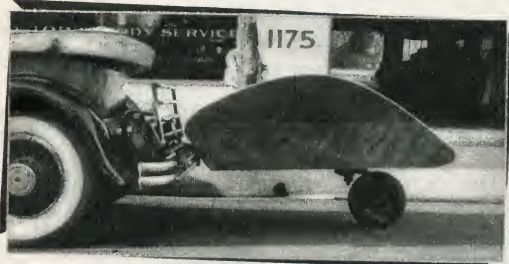
Axles should be trued on a lathe, then greased so as to fit the hubs closely.



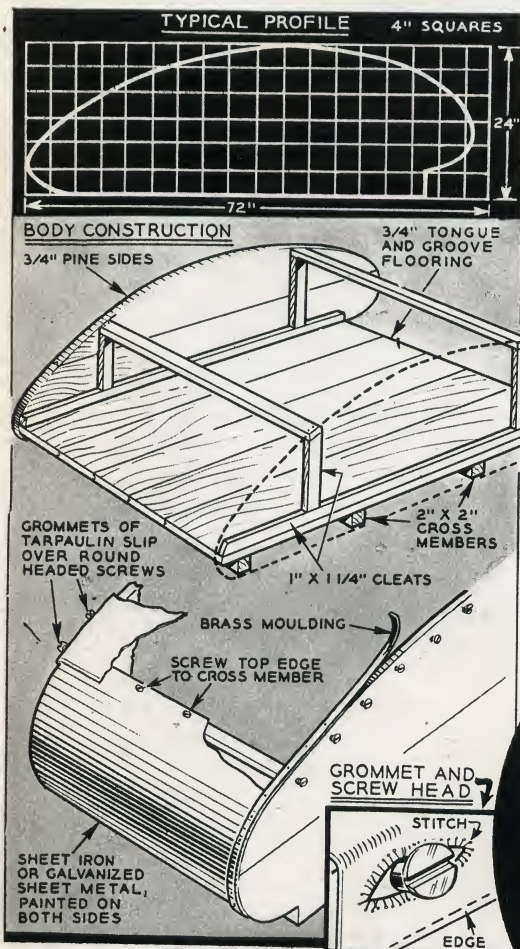
Top view of the bath-house shows disposition of the wheels. Note that front wheels are smaller than rear wheels, to conform to the slant of the beach and keep floor level.

DELIVERY TRAILER ROLLS

by W. B. FAIRWEATHER



Quickly attached to the rear bumper of your car, this trim little trailer is just the thing for light hauling and travel use. A swivel axle permits it to ride on a single donut or air wheel.



DESIGNED especially for sportsmen and light delivery use this single wheel trailer is well suited for hauling moderate loads simply by clamping it to the rear bumper of the car.

No dimensions for the body are given since it can be constructed to meet the requirements of any uni-wheeled trailer chassis. Tongued and grooved material is used for the floor while ordinary lumber is used elsewhere. For the sides $\frac{3}{4}$ -inch pine is best although for heavy duty hauling 1-inch stock may be substituted.

The side panels are cut to follow a streamlined design after which sheet metal covers are fastened over the frame providing a spacious cockpit into which articles to be transported are deposited. A tarpaulin of leatherette or canvas is made to fit over the cockpit and fastened in place by a grommet arrangement similar to the method used for fastening auto storm curtains.

The trailer rolls on a midget air wheel or donut wheel depending upon its size. A standard swivel axle assembly may be purchased or a motorcycle fork can be formed into a satisfactory axle by cutting off the upper portion and welding on a plate to serve as bearing for the swivel bolt.

Bumper clamps can be of the manufactured type or they can be forged



Specifications for constructing trailer body are given above. Since the size of the trailer will depend largely upon the use to which it will be put dimensions are left to the builder's discretion. Sheet metal covers fastened over the ends of the side pieces provide streamlined effect. Tarpaulin covers top.

ON ONE WHEEL CHASSIS



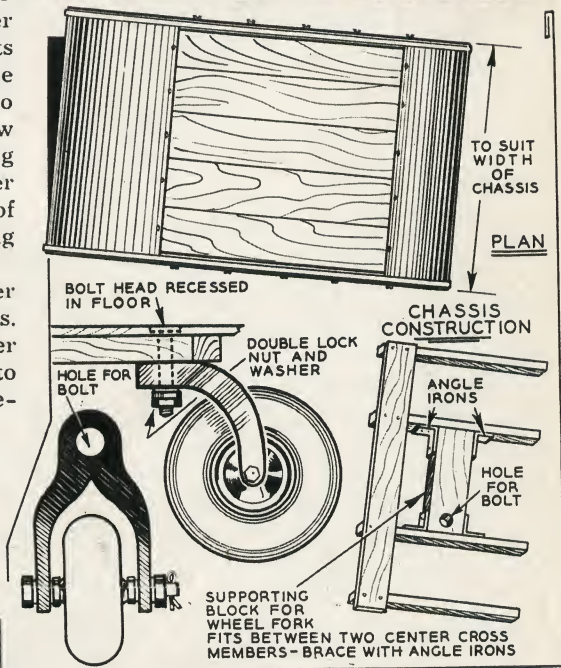
For the sportsman who desires a light trailer this one is ideal. It provides just enough room for carrying hunting equipment and game.

in the home workshop. The manufactured type is recommended since they involve no difficulty to install and can be secured from any trailer supply house at a nominal sum.

In constructing a single wheeled trailer such as this one be careful that the trailer body is not made too wide. For best results it should be built so that its width is about one foot less than the overall width of the car to which it is to be attached. This will allow sufficient clearance when you are passing other cars on the road. When the trailer body is too wide there is always the danger of sideswiping the car which you are passing should you cut your steering too sharply.

Although perfectly safe this type of trailer is banned in some states for unknown reasons. Before starting construction on this or other trailers described in this book it is well to contact your state Department of Motor Vehicles Superintendent or Commissioner's office. They will supply trailer regulations information to you at no cost.

Below—Here is the uni-wheel trailer attached to the rear bumper of car. Only a few seconds are required to detach it since it is just a matter of loosening bumper clamps.

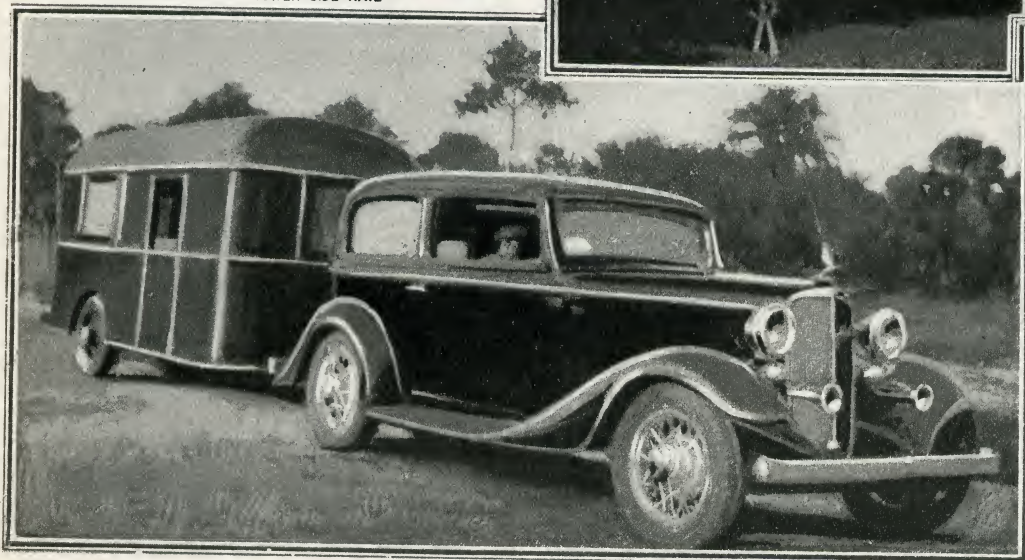
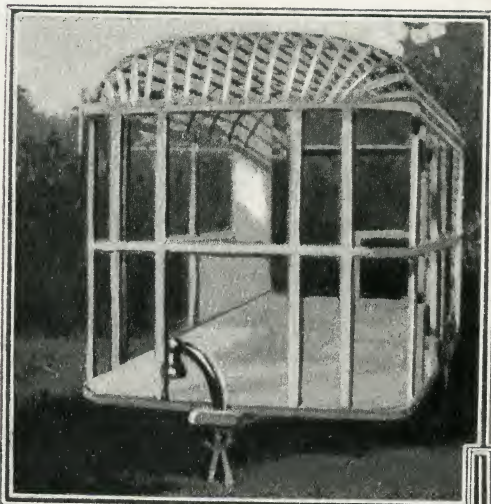
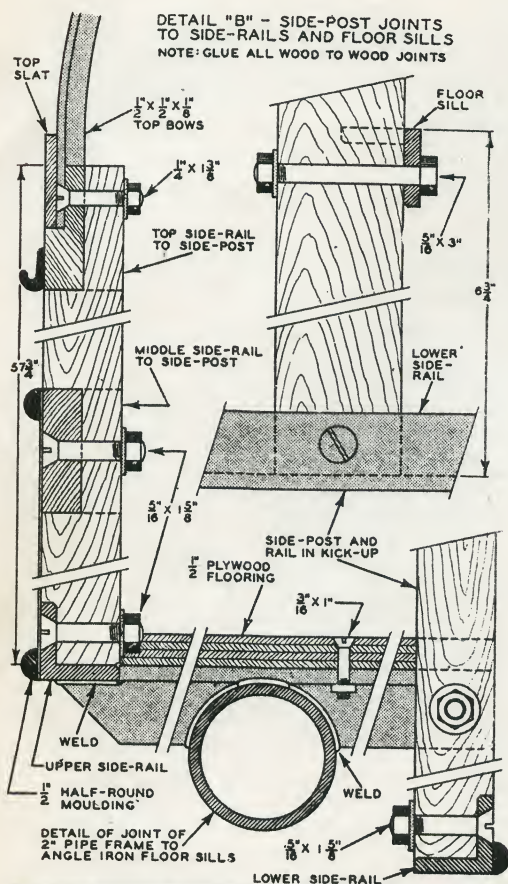


The above diagrams suggest methods for attaching the air or donut wheel to chassis. A supporting block for wheel fork is inserted between cross members and held in place with brackets.

"WANDERER" A LOW COST

"Wanderer," the king of trailers, represents the last word in luxury on wheels. Sturdy as an oak, she'll stand the hardest traveling without a creak. Four passengers can ride comfortably in her quarters.

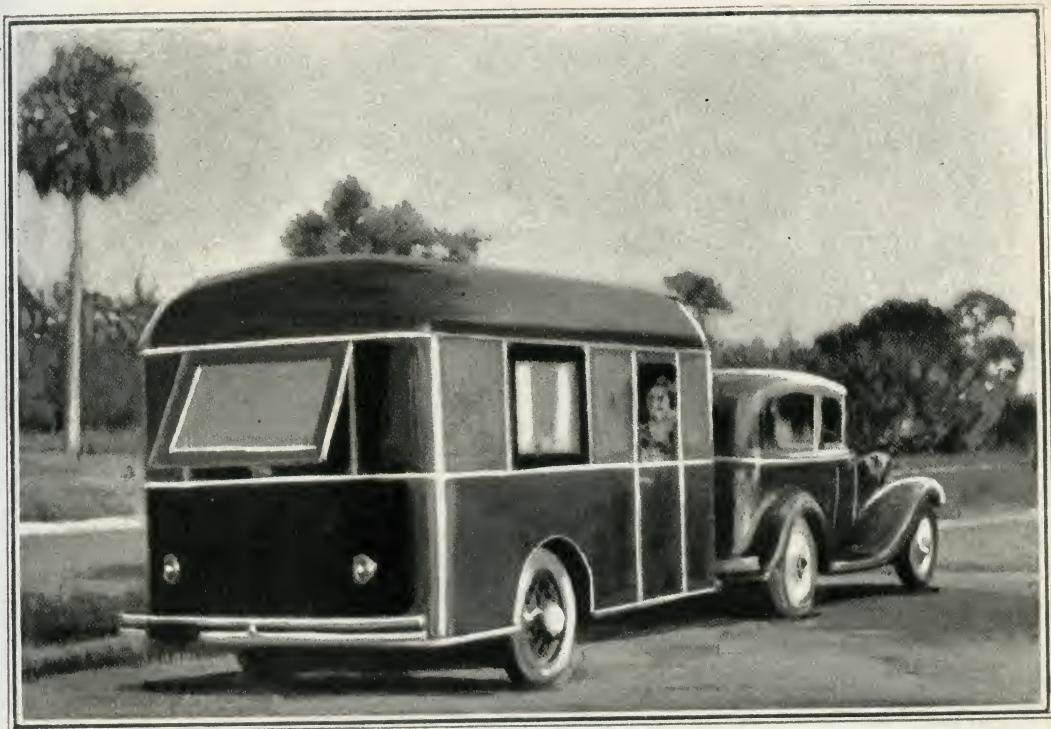
THIS trailer, which its designer has dubbed "Wanderer," is the answer to many requests for a practical low cost trailer. It couples to any passenger car in a few moments, and pulls with remarkable ease. It is the most economical means of traveling, for with it you eliminate hotel and restaurant bills and you can stop when and where you like, regardless of weather conditions.



Top left. Fig. 1 drawings. Below—"Wanderer" on the road. Top right, front view of framework, showing the coupler.

CABIN TRAILER

by E. S. PURDOM



"Wanderer" all completed and off on a cross-country jaunt. She is safe at all speeds, for her center of gravity is kept low. Width is 67 in., length is 144 in., less than average motor car.

This trailer car is safe at all speeds, for the center of gravity is lower than in the average car. The width is 67 inches, which is two inches less than a small auto; the overall height is surprisingly low; the length is 12 feet, or two feet less than a small car.

As for equipment, it has 32 cubic feet of cabinet space including a 3-foot refrigerator, a sink, running water, gasoline stove, racks for dishes and cooking utensils, a dressing table, three-quarter bed and a pullman type berth, a large folding table, radio and two complete lighting systems, 6 and 110 volt. What more could you want?

"Wanderer" is designed to be as light as possible at no sacrifice in strength, in fact, the weight complete is only 1,225 lbs. Keep this constantly in mind when building car, for this is one of the principal reasons why I cannot recommend too strongly that you follow the construction plans exactly.

If you decide to make the frame and axle yourself, follow plans carefully, being sure both ends of pipe frame are in the same plane

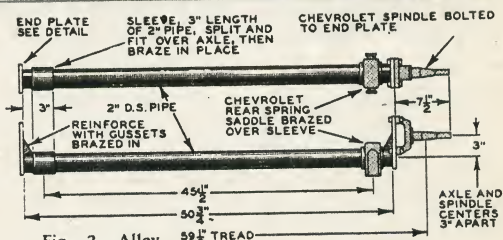
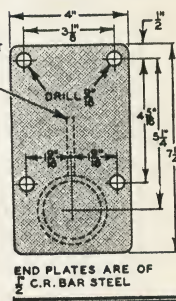


Fig. 2. Alloy steel bolts 9/16 by 1 1/4 secure spindle to end plate.

before welding. See Fig. 2. Be sure the frame is spaced properly over the axle spring saddle.

V out the lower side rail angle to make corner turns. Get a piece of sheet metal and make a template to check these turns, as they must be exact. Do not use galvanized pipe or angle.

Fumes from the zinc are dangerous and you can get a better weld on black steel. Drill axle end plates before welding. After



Construction Of "Wanderer" Not Difficult

aligning plates carefully weld them in place.

Then set up in the lathe and take a light cut from the outer face of each plate. This operation will give perfect alignment of the spindles.

The spindles are Chevrolet '29 to '32. All work necessary on spindles is to ream out bolt holes to $\frac{1}{2}$ inch and saw off the boss from upper side so spindle can fit flat against axle end plate. Braze Chevrolet rear spring saddle to axle as they are malleable castings.

Assemble wheels "Chevrolet '29 to '33" and springs "Chevrolet '29 to '33" eight-leaf rear.

Use old style or "'29" spring shackles and bolts. After assembling the chassis block up all four corners and level the frame carefully, for you will find this a great help later on.

You are now ready for the body. (See Fig. 3.) Have your mill supply straight grained white oak post and side rails in net sizes. They are all of one and one-fourth by two-inch stock. Cut 18 posts $57\frac{3}{4}$ inches long, one post to go under rear window $31\frac{1}{4}$ inches. Cut four side rails 9 feet, $11\frac{1}{2}$ inches long. Also have mill cut 8 oak $1\frac{1}{4} \times 2$ inch corners. Use your 12 inch radius template to lay out.

Cut four end rails 47 inches long. On two sides two end rails and four corner pieces have the mill babbitt upper outside edge $\frac{3}{16}$ inch deep and 1 inch wide as shown in detail "B."

Mortise post and rails as shown in detail B, but do not fit the mortise too tight as it will have a tendency to spring the post and rail out of alignment.

Assemble post and side rails, glue all joints and check for squareness and alignment before glue sets. Bolt post to frame with $\frac{5}{16}$ inch flathead stove bolts. Countersink the bolt head in the frame rail.

Now square up and align end and side assemblies and firmly brace in place.

You are now ready to fit corner pieces. I find an easy way to do this is to use a carpenter square, fitting the square between the posts, marking on it their position. Then lay the square on top of corner piece.

You can mark and cut for an exact fit. To fasten corners in place use 2 by $\frac{1}{8}$ inch steel plate 6 inches long screwed to each end. To brace ends and corners and form bottom of upper cabinets, cut from $\frac{1}{4}$ inch plywood two pieces 12 inches wide and $66\frac{5}{8}$ inches long. Cut ends to fit corner curve, then glue and screw to top of upper end and corner

rails. The floor is $\frac{1}{2}$ inch plywood. Lay and bolt it down with $\frac{3}{16}$ flathead stove bolts as shown in Fig. 1.

Now for the top bows. Cut the lower ends of bows to fit rabbet in side rail and bolt as shown in detail (B). Before bolting up bows lay a straight edge or line along center and along each side from bow 2 to 8, then adjust all bows to this level to get a smooth, level top.

For top slats have mill supply 14 ft. $\times \frac{3}{16}$ inch by $1\frac{3}{8}$ inch straight-grained rip cypress. Soak ends of slats in water for a few minutes and they will bend readily. Bolt center slat first and work each side down together.

Side panels are 24 gauge auto body metal. Nail only upper edge and ends. Lower edge is held in place by $\frac{3}{16} \times \frac{5}{8}$ steel moulding bolted through side panel and rail as in detail B. Allow $\frac{1}{2}$ inch from top of side panel to top of middle side rail for upper side cover nailing space.

At this stage I prefer to build inside trim and cabinets. For the upper end cabinets we already have the bottoms in, so we frame up with $\frac{3}{4} \times 1\frac{3}{4}$ inch stock and panel with $\frac{1}{4}$ inch plywood. Make door from $\frac{1}{4}$ inch plywood and swing from top.

Front lower cabinet includes refrigerator, sink, table, stove and two storage cupboards. Build in as in Fig. 3. Use $\frac{1}{2}$ inch plywood for top, cut ends to fit body corners, glue and screw to top of middle end and corner rails. Ice box is insulated with two layers of celotex on sides and top, bottom four layers. Use 26 gauge galvanized iron for box lining.

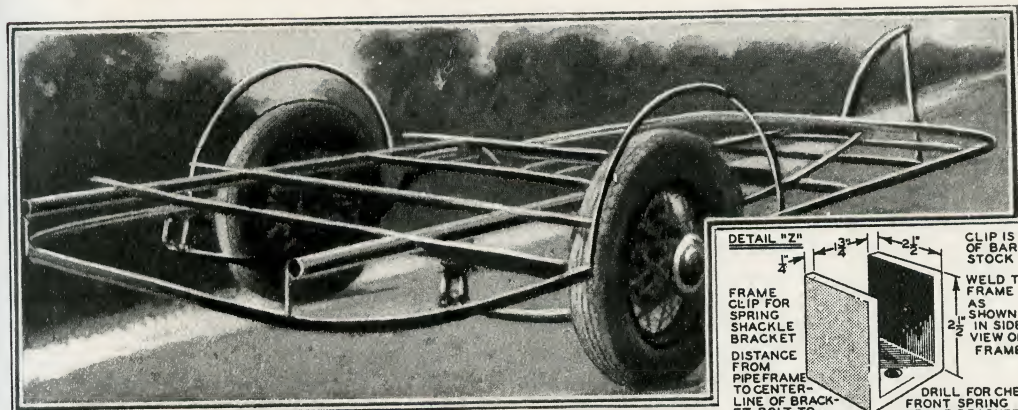
Build in wardrobe and right wheel housing as in plates 1, 2, 3, 4. The top of the wheel housing makes the dressing table. Left housing is made from a '25 or '26 Chevrolet rear fender cut off and bolted between lower side rail arch bar and side panel. Use half circle of body metal left when you cut out wheel clearance from side panel to side up inside of left wheel housing.

The next step is the painting. I painted all inside a dark green except door panels which were stained and varnished. Paint outside lower panels to match tow car.

After painting comes the top and side covers. You will find it makes a much better job to first cover top and upper sides with tan awning material, and then stretch auto top material over that.

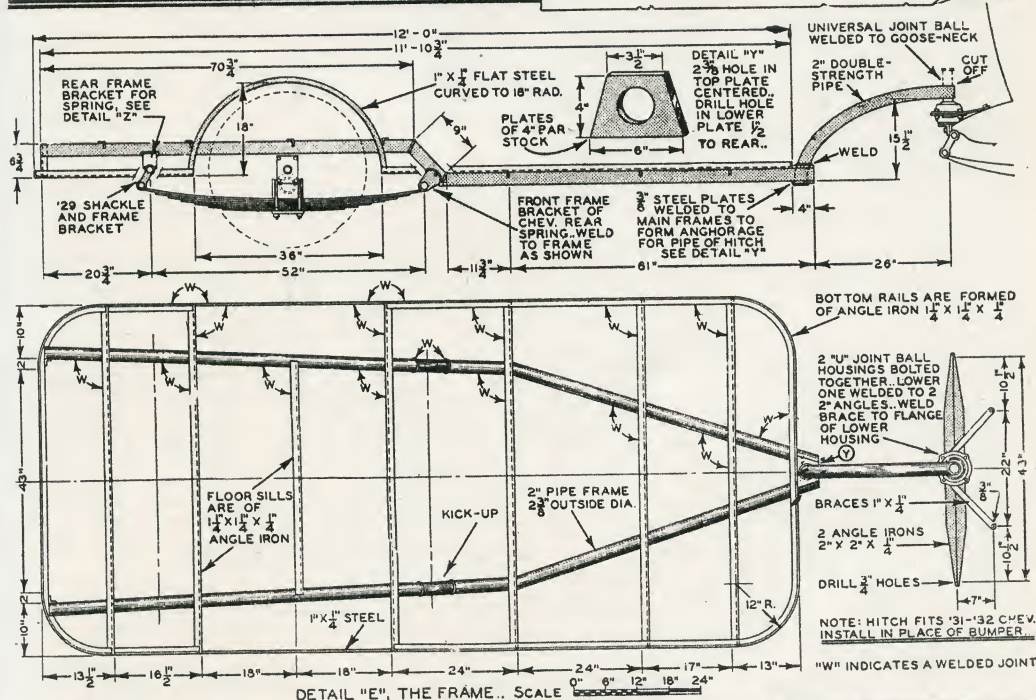
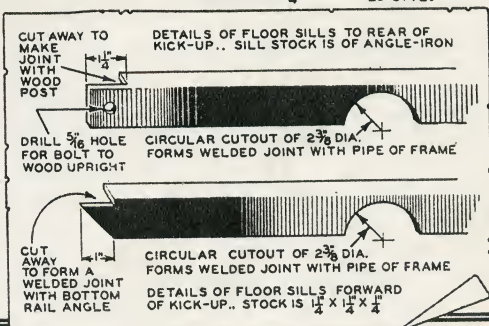
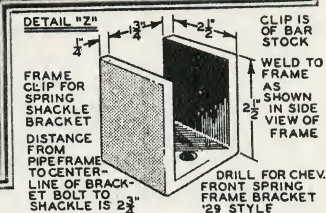
When cutting be sure grain in material

"WANDERER" Requires Less Space Than Ordinary Car



Here's the chassis ready to take the body. It's advisable for you to have local welding shop do the frame and axle assembly job. Cross-pieces are seen in drawings at right.

runs lengthwise with the car. I would advise having an auto top man cut and fit the top, as an ordinary sewing machine will hardly handle the job. For the top use two pieces of 54-inch double texture auto top material, stretched over top of trailer with seam in center. Fold under $\frac{3}{4}$ inch and lap over the other side to make center seam and tem-



Have welding shop follow these plans when assembling the frame for the chassis. Wheel is located at point which makes riding easy, putting little weight on coupler. Biggest job here will be to get perfect alignment of frame and cross-pieces.

DIAGRAM FURNISHES ALL BODY DIMENSIONS

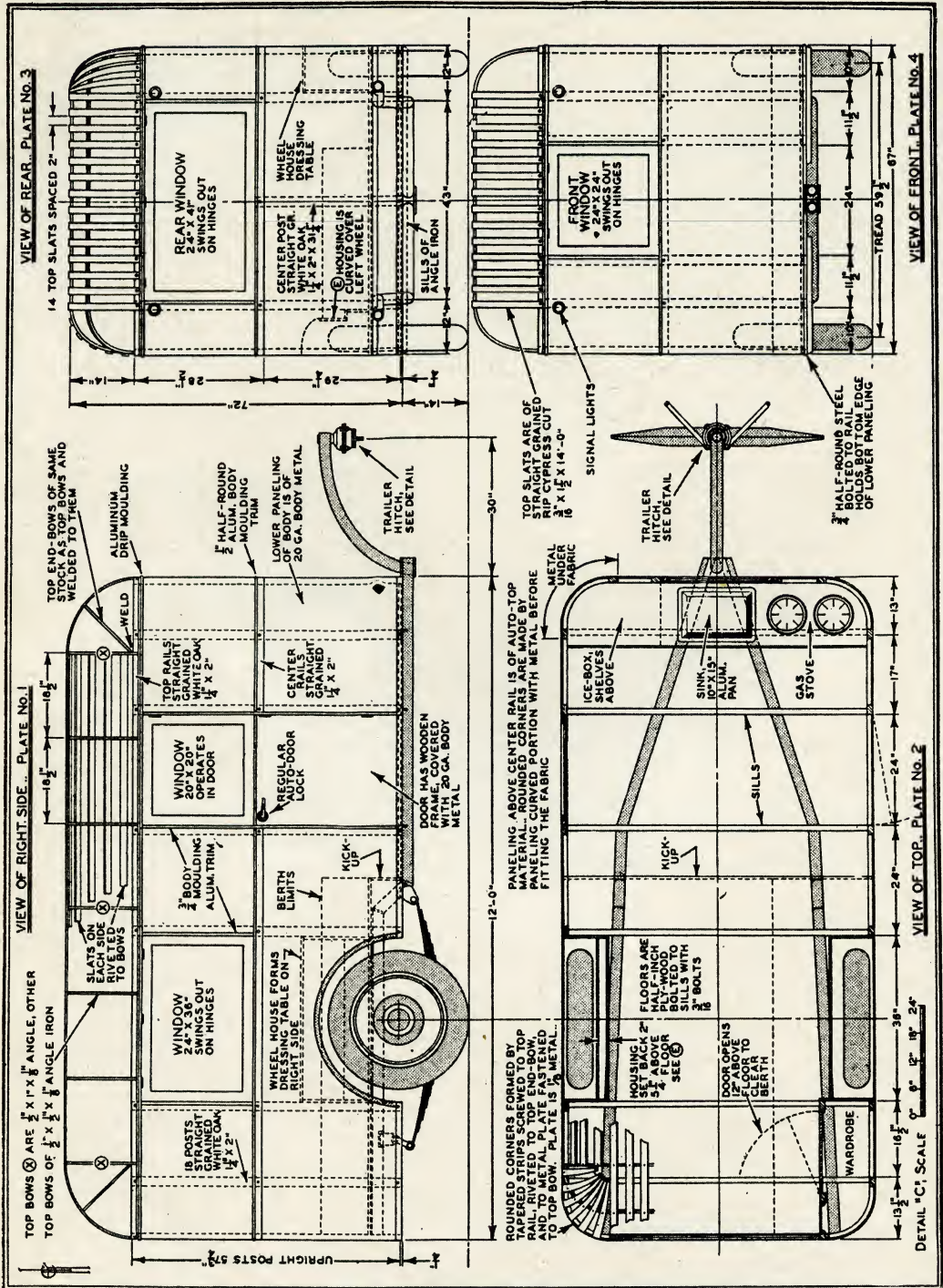


Fig. 3. Uprights and side rails of the body are straight-grained white oak, all of 1 1/4 x 2 in. stock. Glue all joints and check for squareness and alignment before the glue sets. To fasten corners in place use 2 x 1/2 in. steel plate 6 in. long screwed to each end. Side panels are 24 gauge auto body metal. Drawings also show arrangements of interior furnishings. Note that two tiers of bunks occupy right side, while cooking equipment takes up front section. Roof is covered with tan awning material, with auto top material stretched over that. Note that regular auto door locks are utilized.

Extra Fittings Add to "Wanderer's" Beauty

porarily tack in place, but leave both ends loose for about 30 inches. Pull down and temporarily tack sides.

Now pull in end centers, lap over and temporarily tack. Cut corners as in the drawing. Pull out most of the wrinkles, lap over and tack.

Chalk mark all seams, allowing $\frac{3}{4}$ inch for turn-under. Pull tacks, remove cover, and sew with heavy waxed thread. Then put cover back on top.

Starting with a tack in center of each end, pulling out all wrinkles as you go, next tack center of each corner and so on. It may be necessary to dampen the under side of material at corners. It also makes a smoother job to pad corners and end.

Use $\frac{3}{4}$ -inch aluminum runningboard moulding to bind sides of windows and doors. To bind bottom edge of upper side panel, use $\frac{5}{8}$ -inch aluminum crown moulding. For edge of top and side panel use aluminum drip moulding. The top material and mouldings can be purchased from any auto trimmers supply company or from your Chevrolet dealer.

Next job is to hang windows and doors. Swing the windows from the top. Hang the door with hinges to the front. Go to a junk yard and buy a lock and control board assembly from a right front door of a '25 or '26 Chevrolet closed body. Cut off and install complete on your door.

For water supply use a galvanized tank 10 inches in diameter and 24 inches high,

installed in left front corner under sink, with a radiator filler cap on outside of body. The discharge pipe comes in at the bottom of tank, and a tire pump is valved in at top of the tank.

Fill tank $\frac{2}{3}$ full of water, give pump a few strokes and there you are.

For the bunks I use a standard $\frac{3}{4}$ bed spring. Weld on short angle legs and bolt to floor. For upper berth use single or double canvas cot hooked to brackets screwed to side posts over lower berth. To support outer edge use two folding legs to rest on floor. When not in use you can swing whole assembly up and hook to roof bows.

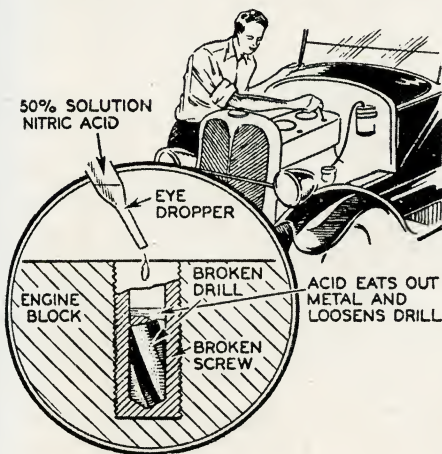
Use a four-wire, rubber-covered cable from trailer to plug-in on car. Install storage battery (6v) in trailer, ground the negative terminal to the frame and to ground wire in cable. Then connect positive wire in cable which continues to battery side of generator.

Use Chevrolet '31 or '32 stop and tail lights, bolting one on each side of lower back panel. As lights and panel are grounded through frame and cable to car, all we have to do is continue tail and stop light wires from the car through the cable and then to their respective terminals on trailer lights.

Install an auto dome light on the forward side of the wardrobe, and another in bottom of forward upper cabinet directly over icebox.

This trailer gives the constructor an unlimited opportunity for making those little fittings and cabinets and gadgets that so delight the builder.

Nitric Acid Aids in Removal of Broken Drills



IF A DRILL should break off when boring into broken stud bolts in an engine block this simple kink will loosen the drill sufficiently to permit its removal regardless of how tightly it may be jammed.

Fill the hole with a 50 per cent solution of nitric acid and water and allow the liquid to react for a few minutes. Blow out the liquid and refill the drill hole, repeating the process until the drill can be fished out with a piece of wire bent to form a hook. After the broken drill has been removed the hole should be thoroughly flushed with water.

Nitric acid should be handled carefully since it not only inflames the skin, but rots clothing if accidentally spilled on it. Yellow laundry soap should be rubbed on the clothing if so damaged to prevent acid affecting it.—R. F. Jennings.

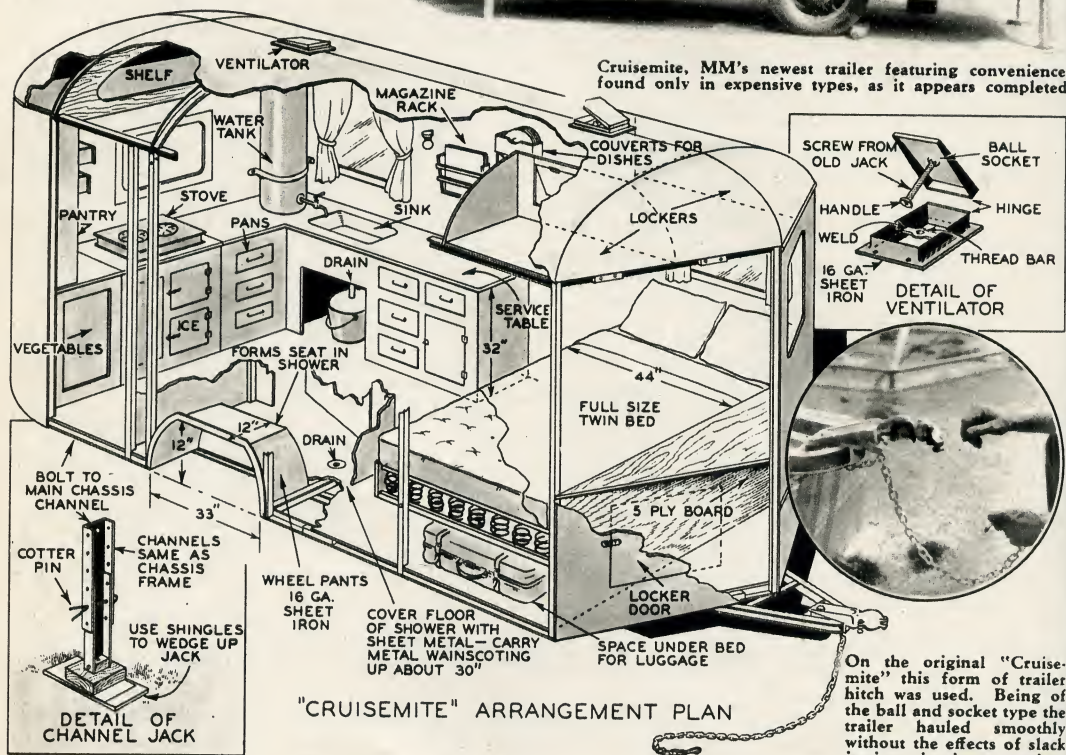
"CRUISEMITE"—A DE LUXE



Designed for the person whose income is limited this camping coach is unique. It is of all-steel construction, yet costs no more than inferior types.



Cruisemite, MM's newest trailer featuring conveniences found only in expensive types, as it appears completed.



THE trailer industry having grown by leaps and bounds during the past few years it is difficult to determine just which type to build. While there are streamline trailers, folding trailers, long trailers, semi-trailers and any number of in between types, "Cruisemite" is a practical coach for home construction. It has been seasoned by thorough testing and free from undesirable features.

"Cruisemite" may be built in several ways, with any number of interior plans. That's half the fun of building a trailer: Planning

the interior yourself. A good standard layout is shown in the plans.

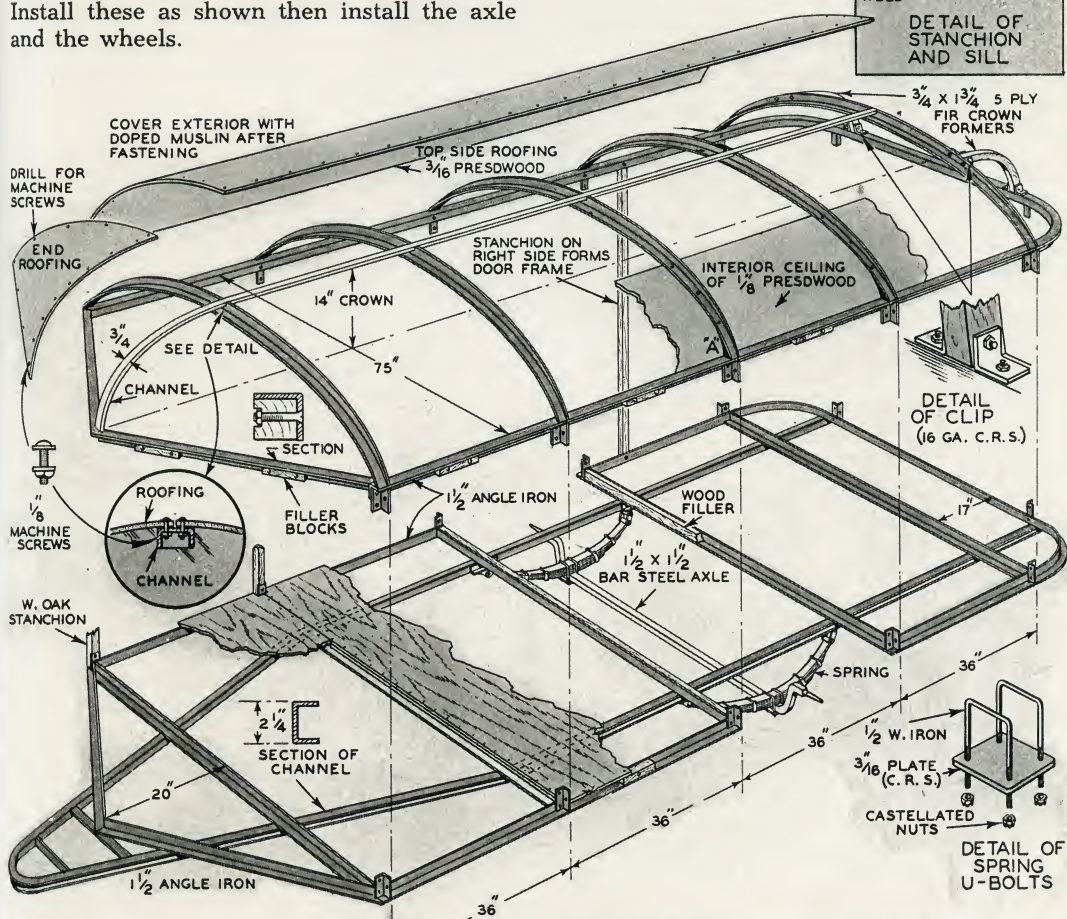
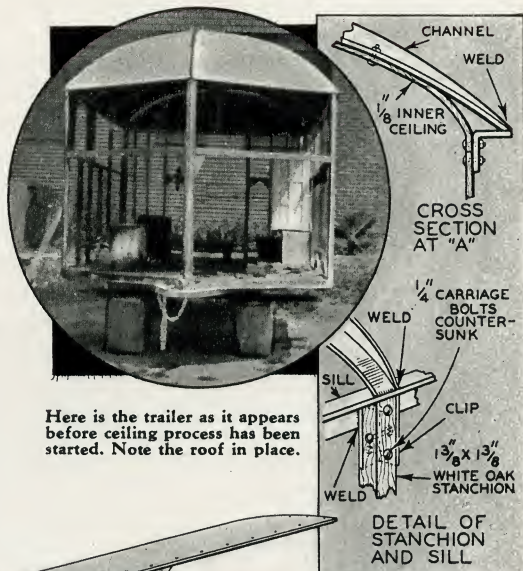
The secret of the easy-to-build part of "Cruisemite" is that she has a steel chassis roof frame. This is welded up out of standard steel channels and angles obtainable at any building supply dealer. A blacksmith can be called upon to bend up the materials and weld the frames. Being of steel, "Cruisemite's" construction is very strong, as well as being very light.

The main chassis frame is of channel iron of $2\frac{1}{2}$ " deep as shown on the perspective

STEEL HIGHWAY TRAILER

drawing. Lay out the half-breadth dimensions and chassis frame lengths in chalk on the cement floor of the garage. Have the channel bent in the middle and at section B to coincide with the floor plan. The bend in the middle is to a radius of 8", making a sixteen-inch loop into which the trailer hitch is later fastened.

Lay the main chassis frame on the floor, and using the chalk outlines as a guide, weld in the cross members, the outside edge angle iron as shown on the drawings and also the clips. These clips are of the same material, 1 3/8" by 1 3/8" angle iron and about 4" long. When this work has been completed, turn the frame upside down and weld in the angle irons and the plates for the spring perches. The spring used is a 28" Chevrolet truck type with 4" shackles to allow a soft riding motion. Install these as shown then install the axle and the wheels.



All dimensions required for constructing the roof and floor framework are given in above diagram. Channel and angle iron welded to the required forms constitute the chassis.

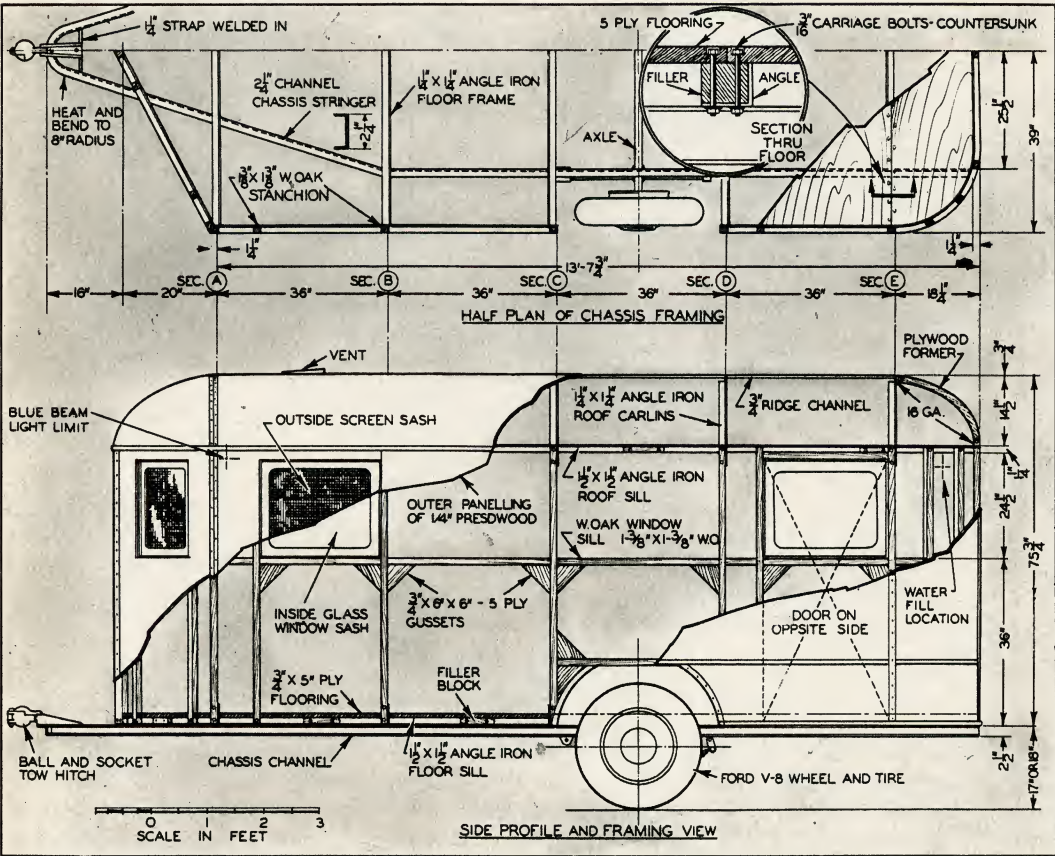
Home on Wheels Offers Many Conveniences

It is suggested that you use a manufactured axle as this will have the ends machined for the spindle, and upset. However, any blacksmith can make you a steel axle with spindle ends for a pair of Ford V-8 front wheels and upset them for the spring depth. The axle must be upset as the bar must pass under the spring. This is not only good mechanical sense, but in many states it is law.

Make the standing jacks, as shown in the detail, next so that the wheels can be fastened on the spindle, packed with grease, and permanently installed. The frame completed, construction is started on the roof. The frame for the roof is built as shown in the perspective detail drawing. The roof beams are tapered on the top edge, either by weld-cutting and grinding smooth, or hot shearing so that at a foot from either side of the center line they taper to nothing at the ends. They can be bent to an absolute crown of 14" or a

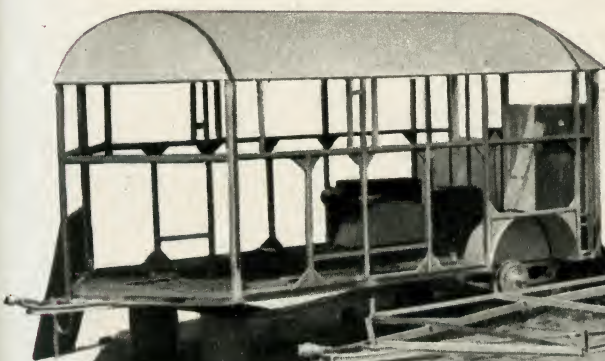
coach crown whichever is desired. Weld the beams, saw out for the 3/4" center or ridge pole channel and weld in the stanchion clips.

You will need 20 (twenty) 1 3/8" by 1 3/8" white oak pieces planed four sides and finished to a maximum of 6" more or 4" less than 5 1/4", depending upon the height desired. At this stage of construction procure about four or five small C clamps and with the help of a few friends fasten the stanchions at sections A and E of the chassis frame which has been jacked up level. Install with 1/4" bolts, countersunk as shown, two transversely and one plain longitudinally. You can bore through the clips easier if an electric drill is used. Plumb the stanchions before final bolting, and then get your friendly help to assist in hoisting the roof truss. This will set on the erected stanchions. It also must be faired and bolted using the C clamps to secure it while the bolting process goes on. Now install the

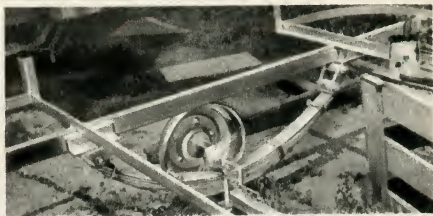


Details of the chassis framing are clearly shown here. The builder is cautioned not to alter the basic design of the craft except for the stanchions which can be altered to provide the necessary headroom. Pans of galvanized iron are attached over the wheels to improve the trailer's appearance. A commercial pressed wood material is used for side construction.

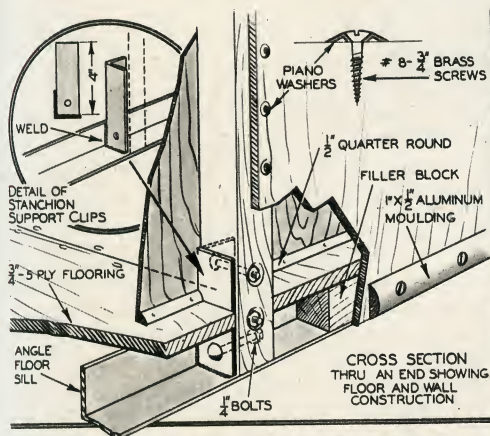
Trailer Frame Is Of All-Metal Construction



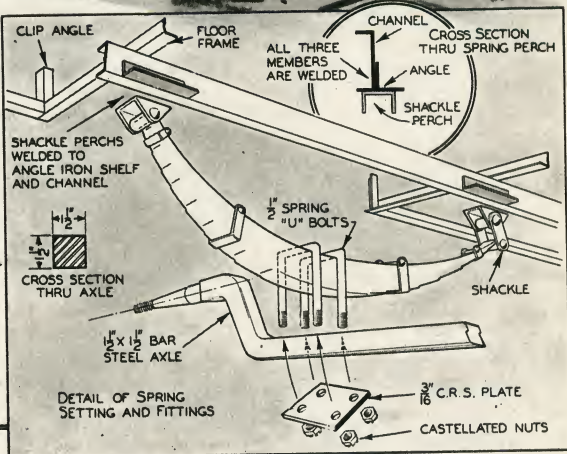
The original "Cruisemite" chassis is pictured here with the roof and floor of a second one. The entire framework is welded together to form a rigid chassis.



Construct the door by following out the details shown here. The pressed wood is fastened to the stanchions with wood screws; piano washers add greatly to appearance of doors when completed.



At left is shown manner in which floor and stanchions are mounted. At right—Method of attaching springs.



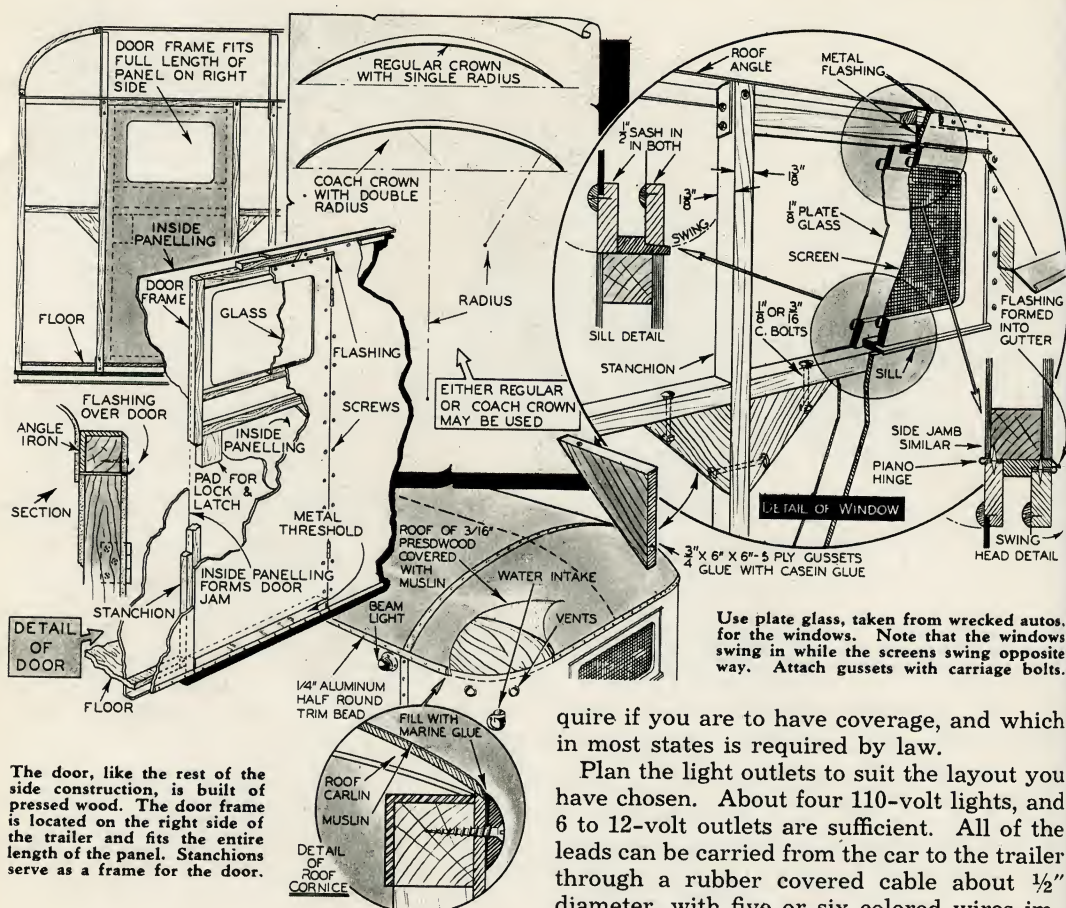
other stanchions. Put in those with the clips, top and bottom, first. The extra, unclipped ones are for the window frames and are attached with single bolts transversely into the longitudinal face of the angle irons. At this stage of the game you will find your trailer in the same condition as a house frame with all the studding and plates installed.

Mount the middle body panel sills at the top and bottom of the windows. These are exactly 4' from the top of the main chassis channel to the top of the sills. The ends butt flush to the stanchions, and are not let in. Plywood gusset plates are fastened with casein glue and bolt to both the stanchions

and the sills, with the outer faces coming flush to the outside of the frame members to give backing to the panelling.

At this point the outer roof ceiling can be fastened on. It is made of $\frac{3}{16}$ " pressed wood sheet, cut in convenient panels and bolted with $\frac{1}{8}$ " machine screws into the ridge and channel members. There will have to be occasional filler blocks placed in the angles for the wood to bear against. Under the forward crown of the ridge pole or center channel you will cut a $\frac{1}{2}$ " by $1\frac{1}{4}$ " plywood carlin or former into which you can later fasten the inner ceiling at this point. The curved formers at the rear of the roof are,

Door and Windows Offer New Safety Features



The door, like the rest of the side construction, is built of pressed wood. The door frame is located on the right side of the trailer and fits the entire length of the panel. Stanchions serve as a frame for the door.

as the drawing shows, $\frac{3}{4}$ " by $1\frac{3}{4}$ " carlins. These are fastened to the channel with 16 or 14-gauge clips, and bolted through. Use screws on the wooden members to fasten the pressed wood down, starting at the center ridge, and working the panels down to the edge.

After the outer portion of the roof is attached, wire up the trailer for lights. There should be three circuits; one for 110 volts for use in parks and in the rear of your home, where you may want to use the trailer as a spare bedroom. There should also be a set of wires for the smaller voltage lights which can be run from the car battery upon occasion, of from an independent generator set. The third set of wires connects directly from car to running lights, which consist of a red tail light with license plate, brake light, required by law in most states, and the blue beam limit lights which insurance companies re-

quire if you are to have coverage, and which in most states is required by law.

Plan the light outlets to suit the layout you have chosen. About four 110-volt lights, and 6 to 12-volt outlets are sufficient. All of the leads can be carried from the car to the trailer through a rubber covered cable about $\frac{1}{2}$ " diameter, with five or six colored wires imbedded; enough to carry whatever circuit you want.

Since no car battery can stand the strain of more than one overnight operation of trailer lighting requirements, a small A. C. generator, powered by the car's motor should be used.

The pants for the wheels must be so fashioned that they will have about 1" clearance over the wheels when the spring is fully depressed.

A good form for dimensions is given in detail. They can be made up by any tinsmith out of 16 to 14-gauge metal, with rivets and soldered seam and bent up flanges for fastening.

The trailer floor is built of 5-ply $\frac{3}{4}$ " fir panels bolted through the filler blocks laid in the channel irons, with the heads counter-sunk as shown in the detail plans. The clips are set in by rough saw cuts as this portion of the floor is covered later by the ceiling.

Use plate glass, taken from wrecked autos, for the windows. Note that the windows swing in while the screens swing opposite way. Attach gussets with carriage bolts.

PAINT, VARNISH ARE ESSENTIAL TRAILER FACTORS

Screw 1" half round between the stanchions with its bearing face flush to the inside face of the stanchions. This will afford a hold for the inner ceiling, which may be of $\frac{1}{8}$ " or $\frac{3}{16}$ " fir plywood, or pressed wood.

Painting the framework is next. Use boiled linseed oil and turpentine, mixed half and half and kept in a double boiler to heat it. Apply a coat of the mixture to all the outside wooden members and steel work. Apply several coats to the wood to prevent dry rot.

Cut the holes in the ceiling for the ventilators. These are a positive necessity, and may be built yourself, or by a tinsmith out of 14-gauge galvanized iron. Now put in the windows and the screens, making them as detailed. The windows in this trailer are a joy to the man who builds his own since no fancy sash work is required. The windows hinge in, and the screens hinge out. Double strength plate glass or safety glass is used for the windows and may be secured cheaply in many instances from a used car junk yard.

Before putting on the outside ceiling, cover the roof with grade A muslin, and dope it with airplane dope, after which the roof is sprinkled with aluminum powder.

The dope will hold the muslin to the ceiling although a few tacks will be needed at the edges to temporarily hold the muslin in place. Dope a few coats along the outer edges first, allowing a good three to four hours in the sun for drying, then do the balance of the roof.

Now for the outside ceiling, which completes the work. The water tanks and the piping for the shower have been put in, and you are ready to finish up the job. This is merely a matter of doping the right size panels to cover the frame, laying it on with good thick casein glue, which holds like grim death, and prevents body squeaks. Use No. 8 $\frac{3}{4}$ " chromium head screws set in piano washers for this, spacing about centers about 9". The seams of the panels should be joined

on a jointer, and not left rough as they come from the saw. It would be well to fill the seam with casein as the panels go on, wiping off the outer edges immediately with a damp rag.

On the bottom and at the seam where the roof meets the side, put $\frac{1}{2}$ oval aluminum stripping. At the roof, there will be an out-gage caused by the crown. Fill this with Jeffery's C quality marine glue, applying hot from a squirt can. The can will pay out enough to make a full seam. Keep a can of turpentine and a rag handy to enable you to avoid sticking up the job. Marine glue must be put on hot, and all slop-overs wiped off immediately. The heating can be done in a pot of boiling water. Keep the glue away from all flames. A bead of glue should also be run around the edges of the ventilators.

A few coats of good spar varnish are applied both inside and out as there is nothing so weather resistant.

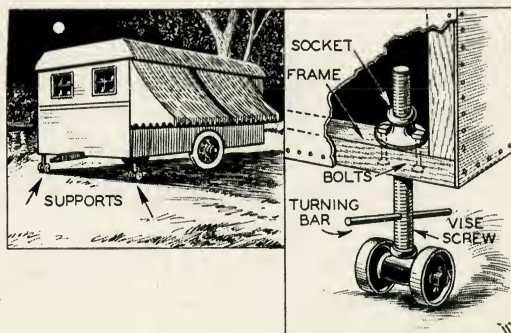
The skirt molding is put on, and the trailer is finished except for the interior joiner work such as drawers and closet doors. The hitch is a good ball and socket type. There are many ways of installing these, but it has been proved best to do it, using both welded joints, for rigidity, and bolts for security. You cannot afford to have a failure occur here. The ball end and the details of this part of the hitch must be taken from the car itself. Fasten the ball hitch to the car frame, and NOT TO THE BUMPER.

CRUISEMITE BLUEPRINT PLANS

Plans for building "Cruisemite," printed on heavy blueprint paper and enlarged to simplify construction are available from this address at \$1.50 postpaid. Send all orders to: Modern Mechanix Publ. Co., Greenwich, Conn.

Screw Jacks Provide Support For Parked Trailers

THE use of blocks or ordinary jacks for supporting a detached trailer is not always good practice since the slightest jar can rock the trailer off its foundation. A pair of inexpensive wood vice screws installed in each corner of the trailer frame make ideal adjustable jack supports. Tees mounted on the ends of the threaded shaft take a pair of casters so that the trailer can be moved about freely. Remove turning bar during travel or drill holes in each end of the bar so cotter pins can be inserted.—Ronald Else, Toledo, Ohio.



Build this MOVIE STAR'S



Here is the trim interior of Sir Guy Standing's trailer. On the sink at left is the portable water tank. Note folding table strapped to the roof. Pipes supporting roof and strengthening guy wires can be seen in rear.

NOMADS of the open road will hail with delight this trailer with the one-man collapsible top and the hanging bunks. It has everything! Designed and originated by Sir Guy Standing, movie star, it was built by California's leading auto trailer expert, Harry Brumpton of Los Angeles. It is so simple that the average man can build it. It is so light that it can go anywhere, yet it will stand up under severe usage.

The top lowers onto the bottom body by the simple expedient of fastening the roof frame to pipes, which slide down into larger pipes set in the body. To raise, merely lift the top, insert plugs, and the top is rigid, waterproof, and cool. Slack in canvas is taken up by merely adjusting the sliding pipes. In traveling, the top lowers onto the body, is fastened down with auto curtain fasteners, and you're ready to ramble.

The body frame is covered with pressed wood, which is durable and eliminates "road rumble." The windows of the trailer are celluloid squares buttoned against mosquito netting, and in addition a skylight provides illumination. By hanging the bunks outside, maximum floor space is obtained and extra ventilation afforded. Those are highlights of the trailer; now to roll up our sleeves and make it.

First take a selected 4x4 spruce, 15½' long, for the keel. This projects 1½' and provides the tongue, on which you later fasten a regulation trailer hitch.

Cheap, light, easy to build, this is the trailer you have been looking for. Its collapsible top and outslung bunks reduce traveling costs and increase camping comforts of motorists.

A 2"x4" frame is then constructed and attached to the keel to form the trailer bed or foundation which is 14 feet long by 6 feet wide. The keel and frame members are braced as shown in Fig. 1 by means of pieces of angle iron and steel brackets.

By studying Fig. 1 it will be seen that the angle iron braces are used only to strengthen the truss about the spring bearers. Fig. 2A shows a typical joint. All remaining joints

are strengthened with steel brackets (Fig. 2B). With the diagonally laid flooring in place, as shown in Fig. 4, this construction will be found sufficiently strong and rigid to carry any running gear.

Now is the time to decide upon the wheels and springs you intend to employ. Measurements and details of the running gear are omitted since everyone has his own ideas on the subject and in any case the fittings will depend upon the type of wheels and springs used. Sir Guy's trailer is rigged with Ford-V-8 wheels but the bearers are long enough to take almost any standard spring assembly. This being so, select and fit your running gear taking care to align it correctly with the frame as the "roadability" of your trailer is intimately associated with this important item.

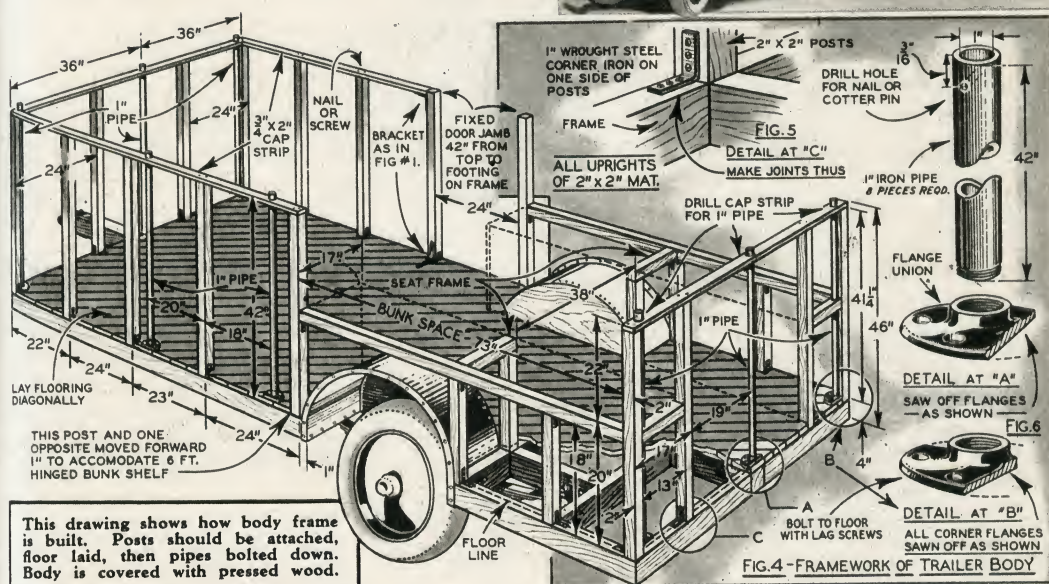
With wheels in place on the bare frame the wheel guards can be figured and fastened in place. The guard is simply galvanized iron curved over a piece of ¾" pine which has previously been cut to the proper shape. (Fig. 3) The completed guards are screwed in place to the frame and we are now ready to lay the floor and proceed with the body frame.

The body frame is made of 2"x2" spruce which is later covered with pressed wood on outside and, where desirable, with plywood inside. Pressed wood at 7 cents a square foot is a cheap covering, wears like iron, and is not only easy for an amateur to apply, but further serves to stiffen the whole body.

Collapsible TRAILER



Photo above shows Sir Guy Standing, movie star, and trailer he designed. It shows the roof raised and bunks swung out. Trailer described here is modeled after Sir Guy Standing's trailer. Right—Drawing shows trailer with top down and bunk folded. This trailer has only one bunk on left side.



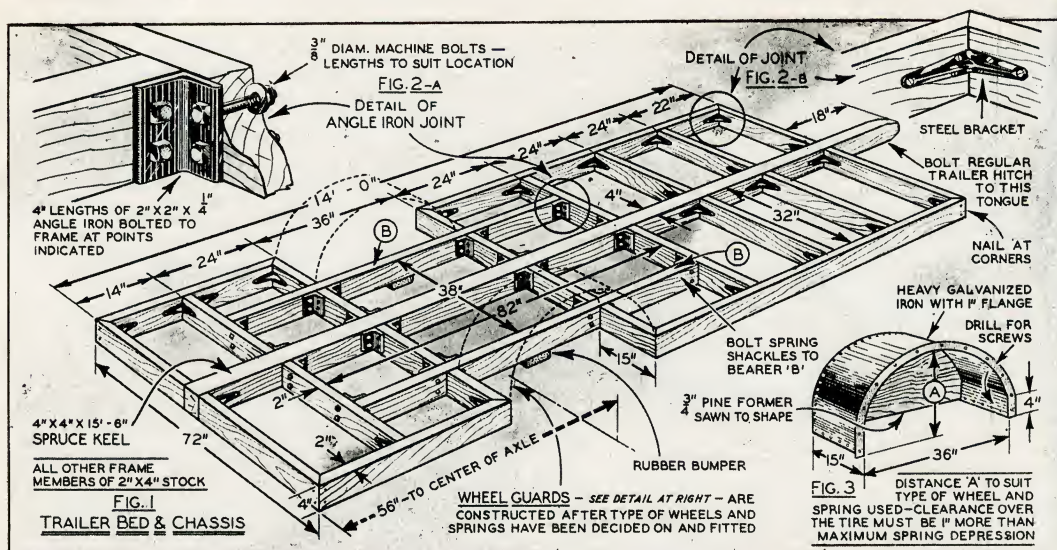
The body stands $3\frac{1}{2}$ feet high above the bed or foundation and is about half the height of the trailer with top raised. Fig. 4 shows the simple sturdy construction of the body frame. The 2"x2" uprights are set at the intervals dimensioned in Fig. 4 and, with few exceptions, coincide with the cross-members of the bed. Two uprights are moved forward one inch to accommodate the hinged bunk flap which is dealt with later on in this article. Also note that the door jambs are spaced slightly wider than the other posts.

This is to accommodate the 24-inch door.

Sir Guy Standing uses three bunks but the average person's needs are amply served by two and so the drawings are laid out to accommodate two wide bunks and no more. If you desire a third bunk it is easily fitted by duplicating the bunk frame construction shown in Fig. 4 and locating it in line with and just ahead of the left bunk frame. Naturally this would have to be done at the time the body frame is built.

To continue, set the uprights in place and

LAY the FLOORING DIAGONALLY OVER the FRAME



Complete details of the trailer foundation are shown above. Running gear available to the builder is attached to the bearers marked B. Flooring, laid diagonally over the frame, helps to strengthen it. Angle irons and brackets also brace it.

anchor to the bed with 1" angle irons, obtainable at any hardware store (see Fig. 5). One iron to each post is specified but if you feel more irons are needed by all means use them. Note that the uprights forming the lower door jamb are $\frac{3}{4}$ " higher than the other full length posts. This is because we will later add two hinged upper jambs which rest upon these posts while the remaining uprights are capped with a $\frac{3}{4}$ "x2" strip as shown in Fig. 4.

Before nailing these cap strips in place drill them at the proper distances for the 1" pipes which should project through the stripping. These pipes form part of the ingenious system employed in raising and lowering the roof. They are secured along the frame at the points indicated by ordinary pipe flanges, sawn off as shown in the detail drawing (Fig. 6) and bolted to and through the flooring with 1½" lag screws. Therefore it is necessary to lay the flooring before proceeding further.

The floor should run crosswise to the keel in order to increase rigidity. Make a neat job laying the grooved wood flooring by slanting your nails towards the last board laid.

With floor laid and edges trimmed take the eight pieces of pipe and bolt them in place. Although the specified length is given as 42 inches it is best to check this against your body frame so that not more than $\frac{3}{4}$ " of pipe projects through the cap strip. The $\frac{3}{16}$ " plug

holes which you have previously drilled should be in line with the cap strip. A steel bracket is added to each of the posts forming the door jamb as shown in Figs. 4 and 7—screw them directly into the floor. Now for the pressed wood siding; interior detail, and such items as the door and the upper jamb.

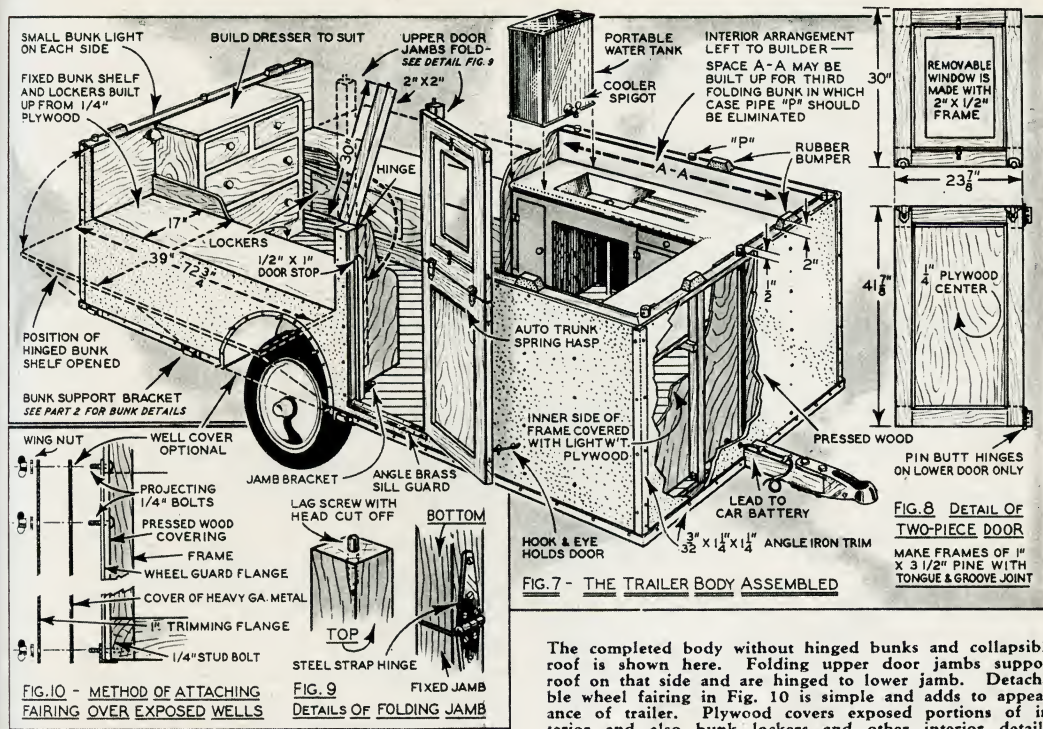
Better make the latter first. As shown in Fig. 7, and the detail drawing, Fig. 9, the upper jamb is simply two pieces of 2"x2"x30" spruce hinged to the lower posts so that they may be swung down and inboard when the top is lowered. The lag screw with head cut off (and preferably rounded by filing) set into the head of the jamb forms a stud which is used to engage suitable slots or holes in the roof frame. As you may have wondered why no pipes are specified for the door side of the body we will explain that the door jamb posts take the place of pipe supports on this side.

The door, if you do not obtain one from a sash and door factory, can be made as shown in Fig. 8. It is in two sections; the bottom part secured with pin butt hinges, and the upper part attached to the lower with the type of spring hasp used on auto trunks.

You are now ready for the pressed wood siding. This comes in large sheets and is sawed to fit. Trim the corners and lower edge of the body with lightweight angle iron.

BLUEPRINTS of this Collapsible trailer are available at \$1.50. Order Plan T-26 from Modern Mechanix Publ. Co., Greenwich, Conn.

THIS ROOMY TRAILER HAS TWO ROOMY BUNKS



The completed body without hinged bunks and collapsible roof is shown here. Folding upper door jambs support roof on that side and are hinged to lower jamb. Detachable wheel fairing in Fig. 10 is simple and adds to appearance of trailer. Plywood covers exposed portions of interior and also bunk lockers and other interior details.

Wood or brass trimming may be substituted to save money but angle iron is recommended. Do not trim the top edges of the body with moulding at this time as it will be utilized to hold the canvas covering in place when you fit the top.

The interior may be finished off with plywood after you have installed your lockers and other furnishings. The bunk lockers, running along the sides and over the wheel guards allow for seats and form the inner part of the bunk shelf. Interior detail is left to the builder. Harry rigged a clever sink arrangement in Sir Guy's trailer whereby the water tank, of galvanized iron, can be lifted off and carried to pump or spring for fresh water. Such a tank is suggested in the drawings (Fig. 7).

The exposed wheel wells can be covered with detachable fairing if so desired but it is not essential. Simply use heavy gauge metal sheet cut to the exact contour of the opening and drill at intervals to fit 1/4" stud bolts which are inserted behind the body frame and project through the wheel guard flange. Slip the fairing over these bolts, add a trimming strip of brass or aluminum and secure with spring washers and wing nuts.

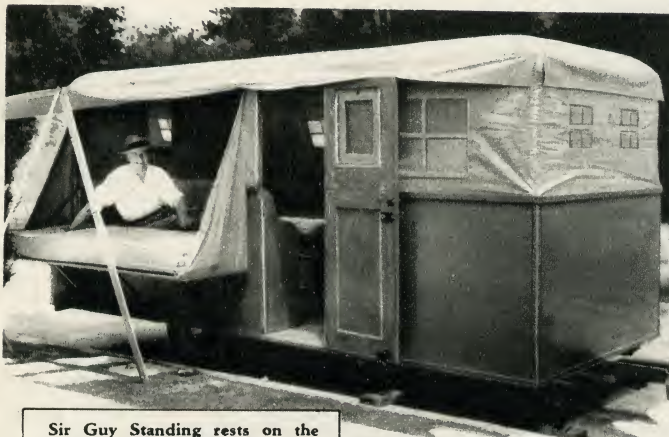
Now to tackle the top and complete the bunk. The upper part and top of the collapsible trailer is held in place by eight 3/4" pipes which slide in the pipes already set into the side and corners of the lower body.

The 3/4" pipes are cut in 3 1/2 foot lengths and drilled with 3/16" holes at six-inch intervals. A heavy eyebolt is welded into the top of each pipe and it is attached to the lower roof rail by a large eyehook. The smaller pipes slide in the larger ones and when you raise the top you hold it up by pushing a large nail or cotter pin through the holes.

To raise the roof, one end is lifted about six inches and pegged, then the other end is raised 12 inches, and so on until the top is in position. After raising top to test it for position, mark the smaller pipes, remove and drill additional holes about one inch apart to provide a means of adjusting the tension of your canvas in case it should stretch or shrink, or in case of slight errors made when sewing the canvas. Details of the upper pipe and pin are shown in Fig. 17.

Before proceeding with the roof however it is well to complete your bunk flaps. As previously explained, the bunk foundation rests on the locker seats and projects, on

CONSTRUCTING THE TRAILER ROOF AND BUNKS



Sir Guy Standing rests on the open bunk of his trailer. The tent poles hold the bunk flap up.

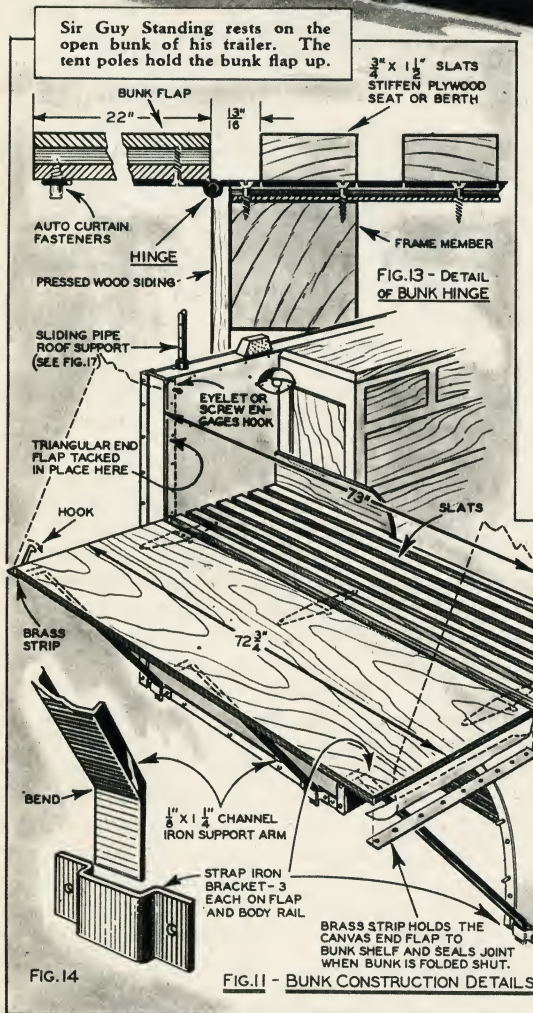


FIG. 14

FIG. 11 - BUNK CONSTRUCTION DETAILS

hinges, from the trailer body. The hinged portion which is fully covered in Figs. 11 to 14, can be built up to suit or as shown with a simple sheet of $\frac{3}{4}$ " plywood. Place auto curtain fasteners under the bottom edge of the flap. These are to hold the bunk curtain when bunk is extended or the rain flap when top is down and bunk folded.

Channel iron or angle braces are used to support the bunks when open. Make three for each side bending each end of the brace as shown and cutting

off the flange where the iron fits into the bracket. Six strap iron brackets are needed for each bunk; three being attached to the under side of the shelf and three to the lower body moulding. Bolt or rivet them in place.

The bunk foundation shown is designed to accommodate a standard 39"x72" cot pad. Sir Guy uses a specially made mattress and those who feel like spending the extra money will find that a divided mattress is handier and will solve the otherwise difficult problem of stowing the mattress when the bunk is folded.

Now for the roof. Your first consideration in making the roof is to lay out the two

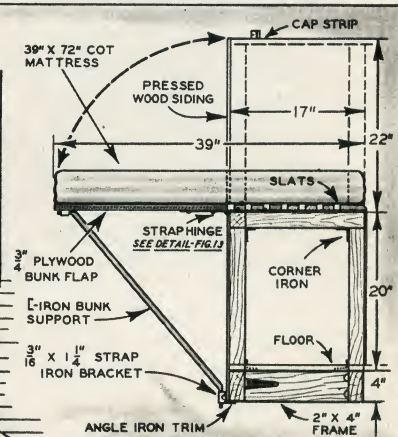
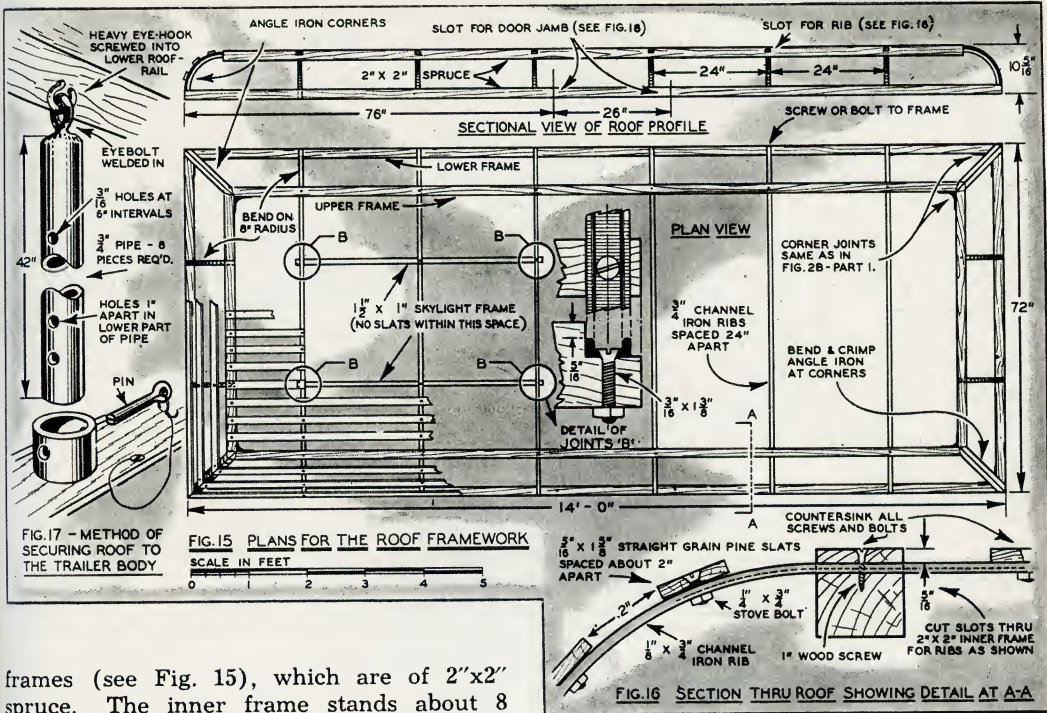


FIG. 12 - SECTION THRU BUNK FRAME AFT OF STARBOARD WHEEL GUARD.

The bunks are swung out and supported with channel iron arms while in camp. When traveling, bunks fold up flush with body. A standard cot mattress can be used and stored inside when on the road. A divided mattress is better.

HEAT ALL CHANNEL IRON RIBS BEFORE BENDING



frames (see Fig. 15), which are of 2"x2" spruce. The inner frame stands about 8 inches above the lower and is attached to it by means of channel iron ribs which are spaced 24" apart.

These ribs should be bent on a radius of 8 inches as shown. The easiest way to accomplish this is to heat the iron red hot, clamp it at one end and bend it over a form with a sledge hammer, bending slowly. Of somewhat larger width and of angle iron, the corner pieces are bent and crimped to provide smoothly curved supports at each of the four corners of the roof. For the slats use straight grain pine, 1 5/8" wide by 5/16" thick, to run lengthwise of the trailer top. As shown in Fig. 16 the ribs are run through the top frame members so that slats are flush with this frame when bolted in place. Use stove bolts to attach the slats.

It is advisable to leave out the slats within the space indicated as the skylight which is later sewn into the canvas covering at this point. A skylight frame is shown but is not essential as the slats themselves are sufficient edging at this point.

Now attach the upper pipes to the outer roof frame and raise in position. This is your final checkup before putting on the canvas and it is at this time that you mark off the upper pipes and drill the additional holes mentioned previously.

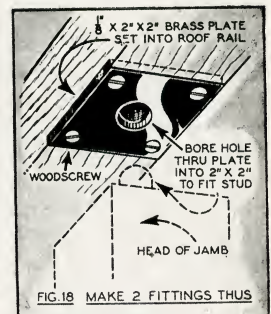
Complete layout of the roof framework is shown in the above drawings. The channel iron ribs should be heated red hot and bent slowly over a form with a sledge hammer.

If you are going to sew the canvas covering yourself the windows will probably be your chief difficulty. If in doubt, have them made up by a tent and awning company.

Windows should be canvas rimmed with button flaps to hold the celluloid squares against the mosquito netting which is sewn into the canvas. The skylight, of extra heavy celluloid, is sewn into the covering.

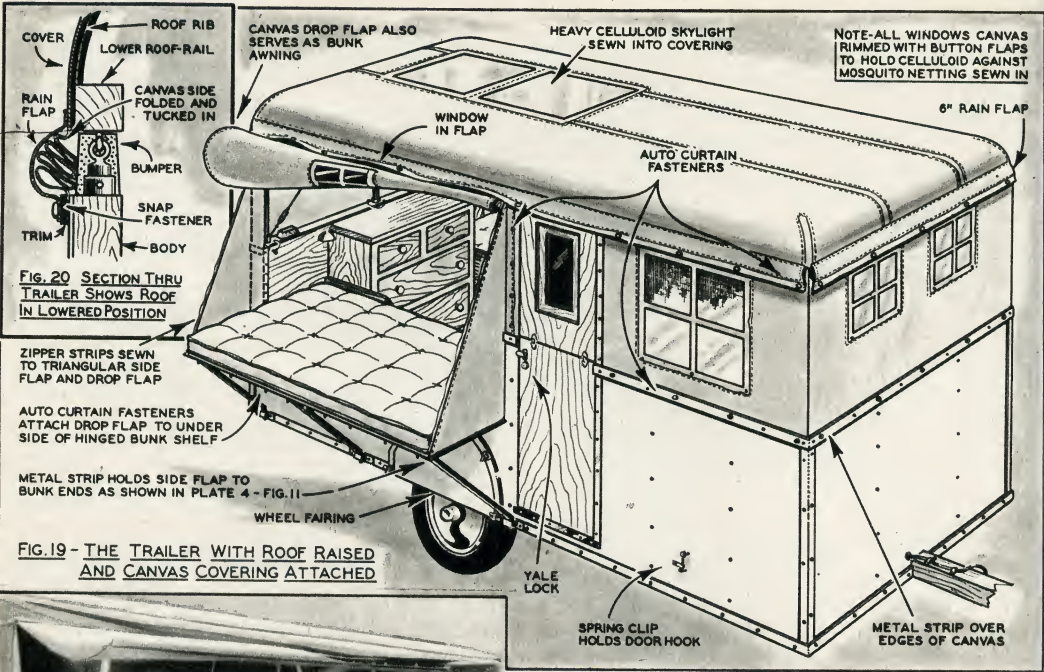
Around the entire edge of the canvas top sew a 6-inch rain flap and insert auto curtain fasteners as shown (Fig. 19). When the top is lowered this flap fastens to fasteners set on the trailer body to hold all snug and tight.

The canvas sides are attached to the lower body by the moulding which is now applied. To fit, first lay the canvas and raise the roof to the proper



This detail shows how door jamb stud is fitted into a metal plate in the roof rail.

TRAILER PROVIDES ALL the COMFORTS for TOURISTS



Sir Guy Standing, Paramount star, uses his trailer for fishing and painting expeditions. Here he is painting in the shade of the bunk curtain supported by tent poles.

position. Then draw the sides through the moulding (which is preferably of metal) until it is taut and screw down tight trimming off the extra canvas with a razor blade. Auto curtain fasteners are placed along the moulding to correspond with those set along the rain flap.

After fitting the canvas top you can install your bunk curtains. They are comprised of two triangular side strips and a curtain

Canvas sides are held firmly to body by metal moulding. Curtain rolls down and fastens underneath to cover bunk completely or can be raised on tent poles. Celluloid windows can be removed letting in air through netting.

which is sewn to the top and attached to the side strips by lengths of zipper stripping which is sewn to the canvas. A window is located in the main flap and auto curtain fasteners set into the lower edge coincide with the fastener on the under side of the bunk shelf.

Tent poles, which are easily packed inside when traveling, and guy ropes raise the flap as a sunshade when set up for camp.

A chest of drawers, such as shown in the illustrations, is a necessity rather than a luxury and can be simply built. Sink, stove and icebox you will arrange to your own satisfaction and purse. A folding table can be strapped to the inside of the roof when not in use.

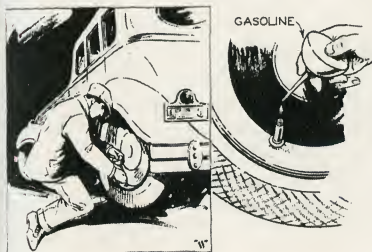
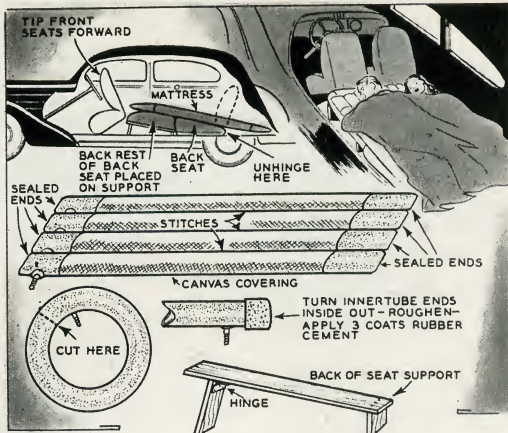
Lights will be needed of course and you should install an outlet plug to carry a lead to your car battery. Or you may pick up and install a battery in the trailer itself, belting an old auto generator to one of the trailer wheels for charging purposes.

For added rigidity in high winds you will do well to install light guy wires criss-crossed at either end of the trailer from roof frame to body.

Summer Suggestions for Modern Motorists

Folding Seat Forms Auto Bed

WHERE the pocketbook does not permit the use of a trailer the summer tourist will find this simple auto bed the ideal thing for traveling. Intended for use in 1935 and 1936 model Fords provided with a folding rear seat the bed consists of lengths of inner tube sealed at the ends and formed into an air mattress as described in the illustration. The back rest is placed on a simple wooden support and the mattress then placed on top. The streamlined design of the car allows for sufficient foot room. When not in use the bed may be stored in the tool compartment by deflating the mattress.—L. W. Edgerton.

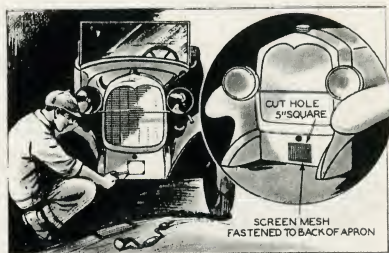


Gasoline Stops Leaking Inner Tube Valve

WHEN an inner tube valve leaks and it is impossible to procure another at the time, a few drops of gasoline in the valve step will usually correct the trouble. The gasoline when put into the valve softens the rubber sealing washer of the valve core causing it to swell and in a few moments effectively seals the leak. The repair will last until a new stem can be installed.—E. J. Novak.

Opening In Splash Apron Cools Hot Engines

WHEN driving a car at high speeds in warm weather for any length of time the oil in the crank case thins out to such an extent that damage to the engine is sure to result. To overcome this danger cut an opening in the splash apron six by five inches and insert a piece of copper screening of fine mesh. This will permit air to circulate around the engine, cooling the oil sufficiently.—J. Emil.



Hot Oil Cleans Out Gear Housing

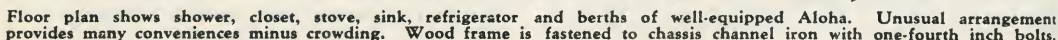
SINCE very few cars are provided with drain plugs on the steering gear housing they never receive the necessary flushing until some part is damaged and the housing has to be taken apart for repairs. This trouble and expense for new parts is very often caused by lack of the required flushing which would have prevented the parts from wearing.

Any motorist can flush out this housing even though it is not provided with a drain plug. Fill a grease gun with hot cylinder oil and force the oil into the housing through the filler hole.—J. E. Kavon.

by ROBERT W. YORK

If a trip of any length at all is planned, every convenience possible should be provided to get the most in pleasure and comfort from the trailer. What could be more

A shower is always refreshing and regardless of where you are there are times when you would like a little pepping up. This pleasure may be enjoyed even while you are on the road. Many times there are occasions when something a little nicer than driving or camping togs would be more presentable. The writer has designed this trailer to provide all these conveniences and benefits and many more as will be disclosed later, at a cost that



TRAILER FOR TOURISTS

is no greater than the average well designed trailer. Yet Aloha is no more difficult to construct.

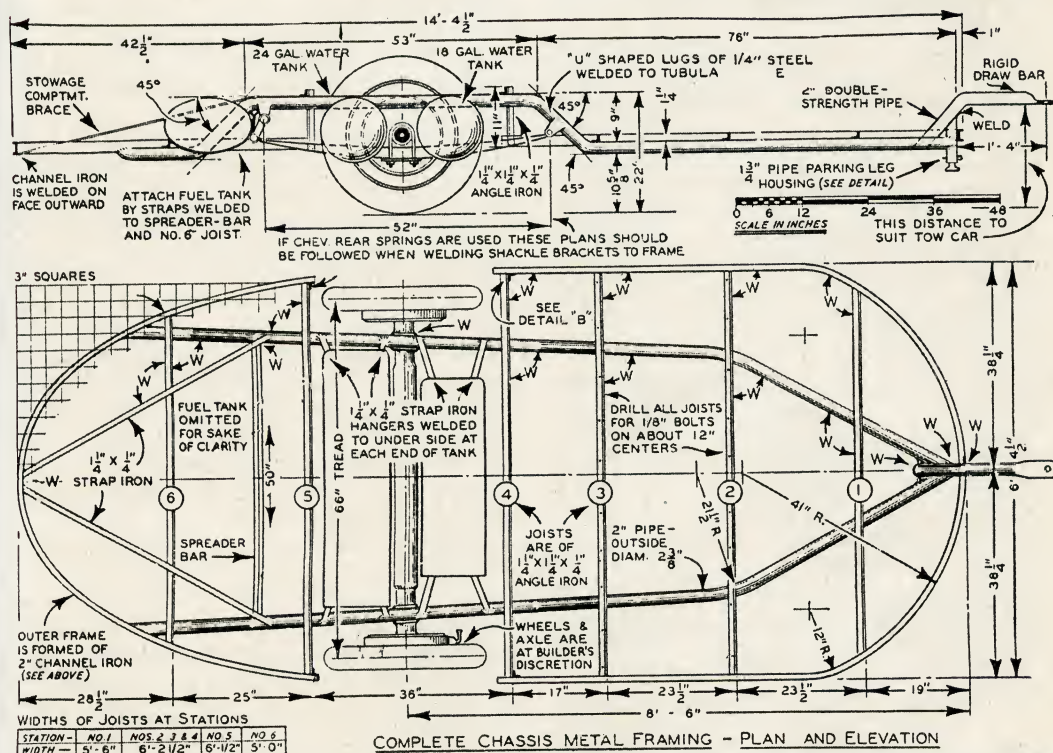
Aloha has the good features of a number of designs with many new ones added, making the completed cabin one of unique arrangement and beauty. You will be proud of this trailer anywhere.

Although this design is not a perfect streamlined job, still every effort has been made to cut down its head resistance and the vacuum at the rear. The roof has also been treated in a similar manner to reduce air friction along its entire surface. All these changes have been made without losing interior convenience or comfort and with these changes it is safe to say that the cost of towing this trailer will be less than 4% more than the cost of running your car.

The chassis has a double bend over the axle to provide a large stowage space at the stern. The road clearance is 12" at all points except at the parking leg which has a minimum

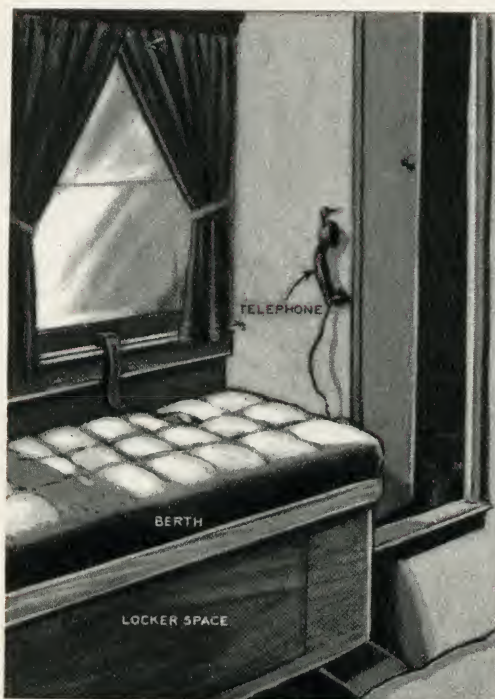
clearance of 8". Another feature of this chassis is the added floor length. It has been found that the average floor length in other trailers is 12 feet and the over-all dimension from rear to tip of draw-bar is 15 feet. In this design the floor length is 4'-6" and the o. a. is 15'-9 $\frac{3}{4}$ ". Due to the curved front of the chassis this trailer will allow the towing car to turn in a radius as sharp as that allowed by any other trailer design.

The chassis consists of two 2" pipes, having two vertical bends over the axle and one horizontal bend near the bow. The bow ends are brought together and welded to a short length of 1 $\frac{3}{4}$ " pipe vertically placed with one end 2" below the larger pipes. This vertical pipe is called "parking leg housing," which will later be described. We next weld to the chassis frame before it gets out of line $\frac{1}{4}$ "x1 $\frac{1}{4}$ "x1 $\frac{1}{4}$ " angle iron joists which are spaced and of the lengths indicated. Care must be exercised to see that the joists are at right angles to the center line of the two

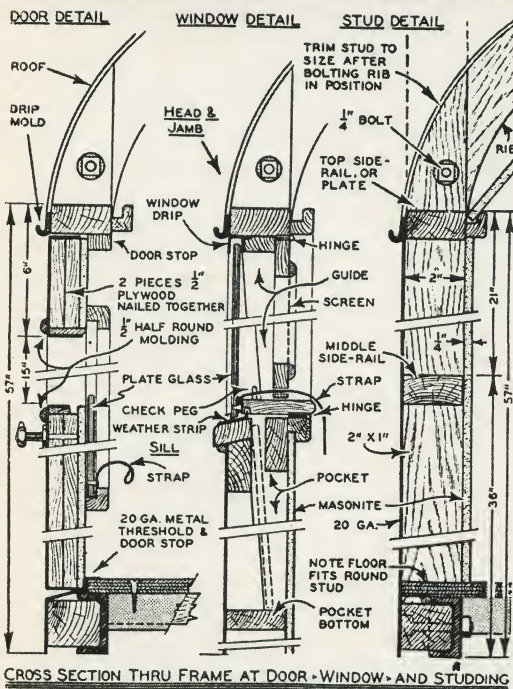


Six cross bars are welded to the two-inch chassis pipe frame. The frame bends over the axle to aid balance of trailer. Lay out the rear curve of body frame by making full size squared plan. Radius of major front curve is 41 inches.

Shower Is One Of "Aloha's" Conveniences



A neatly arranged interior, that is far from overcrowded, is a feature of "Aloha." Here is a view looking forward. Covering the floor with linoleum adds a finishing touch.



CROSS SECTION THRU FRAME AT DOOR-WINDOW-AND STUDDING

Details of windows and door illustrate construction recommended. Flooring is laid to extreme edge of chassis sill frame except at door, as shown, and at wheel wells. Note that window stool and screen frame are hinged to permit window to be lowered. Auto door lock is best for door.

chassis frames which are separated as shown on the drawings. Two pieces of 2" channel iron are then bent to the curves indicated and welded to the ends of the joists with the upper channel flange faces level with upper edges of the joist vertical flanges.

It will be noted that the two joists nearest the wheel wells are considerably above the ends of the channels. These loose ends may be tied together by welding a short piece of angle iron vertically to the joist and channel ends. A spreader welded to the undersides of the chassis at the after bends as shown on the drawings and which is another piece of angle iron of the same size described above will act as the upper support of the fuel tank. For added safety factor, in case of overloading the stowage compartment, we next weld two pieces of $\frac{1}{4} \times 1\frac{1}{4}$ strap iron to the bottom of the stern channel bar near the center line and to each pipe chassis member at the point where the after bend is located, just aft of the wheel well.

The method of securing axle to springs as shown on the drawings is an extremely simple one and is shown as a second alternative only. To secure the axle assembly to the chassis, four "U" shaped lugs made of $\frac{1}{4}$ " steel will have to be welded to the pipe frame. The exact location and spacing of these lugs will directly depend upon the type and equip-

"Aloha" Is Ideal For Cross Country Tours

ment used. Be sure, however, that the clearance between the top of the axle housing and the bottom of the pipe frames is at least 4" when assembled.

The draw-bar is next in line and two suggestions are offered. The spring arrangement is the writer's first choice and consists of a Ford front axle spring bent in the manner shown and bolted inside a 2" pipe that has been formed to receive it. As each car presents its own problem for hooking on a trailer, the height on the chassis frame elevation is not given and details of connections are omitted. After this height has been determined by the builder, the formed length of pipe is then welded to the two 2" pipe frames and the top of the parking leg housing. Care must be taken not to get the length of the spring shorter than is specified or there will be future trouble at sharp turns. The parking leg consists of two pieces of pipe telescoping within the housing. They are held in position while traveling by means of a pin passing through the bottom ends of the housing and the two pipes. In parking position the pin passes through the housing and the larger of the two pipes as will be readily seen in the detail. A flat metal foot welded to the bottom of the smaller pipe will keep the leg from sinking into the ground.

This completes the chassis and you are ready for framing of sides and roof but before proceeding a word of advice here may be useful. The water tanks may or may not be used as they are indicated on the drawings, or you may feel that only one will suffice. The writer has found in similar matters that it is better to have too much than not enough when it is most needed. This job is extremely stable because of its low center of gravity. The possibility of capsizing is remote but if this design did not have these features, the low slung water tanks would establish them. Consider then the added advantages here plus a large source of water supply. The method of hanging these tanks is accomplished by welding two iron straps at the ends and undersides of the respective tanks. The free ends of the straps are bent up and over the tops of the pipe frames and welded.

The placing of the tanks concludes all the welding there is to be done and all the heavy iron work. Unless you have ready access to a welder's outfit and know what you are

doing, it is strongly recommended that this work be done by a man who thoroughly understands his business.

The body is built after the chassis is completed. Check the chassis to be certain it is square and plumb. The wheel alignment must be true and at right angles to the line of pull, which will be the chassis centerline.

Then you are ready to proceed with building up the body. Here a band saw would come in handy but if you haven't one, you will be in no worse position than the writer. It will be noted in the chassis drawing, that the flanges of the channel iron face outward. This is in order that a wood member $1\frac{1}{2} \times 1\frac{3}{4}$ may fit snugly in the channel. This sill may be placed in two ways, either by steaming and bending to shape or cutting in the required curve. In either case this wood sill is bolted to the channel iron using $\frac{1}{4}$ " stove bolts placed at 2' centers.

Next cut the required number of frame studs to hold the side rail strips and plates. 6". At the dimensions shown on the plans $\frac{3}{4} \times \frac{3}{4} \times 2$ " cleats are nailed on both faces of the studs to hold the side rails strips and plates. Notch out one end of each stud and the sill where the studs occur to form a snug mortise joint, and bolt the studs to the sill with $\frac{1}{4}$ " stove bolts. Be sure that the outer faces of the studs are flush with the outer face of the sill. Nailing strips are now to be placed where the lower set of cleats occur. To get the correct curves for these members lay the raw material on the sill between their respective studs and mark the outer curve of the sill at the same time keeping the inner edges in a straight line. Establish the respective angles at the ends for nailing to the studs to form a neat joint. This nailing strip need not be more than $\frac{3}{4}$ " thick and occurs only where disappearing windows are not used. A study of the details will explain existing conditions there.

The top side rail or plate members are cut and fitted in a similar manner but inch stock is recommended here. Assuming that all the plate and nailing members are cut, take a pot of water-proof glue and use freely. Then nail the rails in place against the cleats using a fair size finishing nail. Temporarily brace the work so that it does not get out of square or plumb while the glue is drying.

The roof is the next step and we begin by cutting the longitudinal truss member, the

Plans Furnish All Dimensions For "Aloha"

piece that runs from front to rear of the roof. Reference to the drawings will disclose the method of plotting this curve. Plotting should be done on a large sheet of wrapping paper to form a full size pattern. We then lay this pattern on a level floor. Strips of plywood $\frac{3}{8}$ " thick, 6" wide and as long as the curves will permit are then laid over the curves of the pattern end to end. Make good butt joints where the ends meet. Cover the upper faces of these pieces with a generous coat of waterproof glue and lay on another layer of veneer or plywood. Repeat this procedure until three layers are in place.

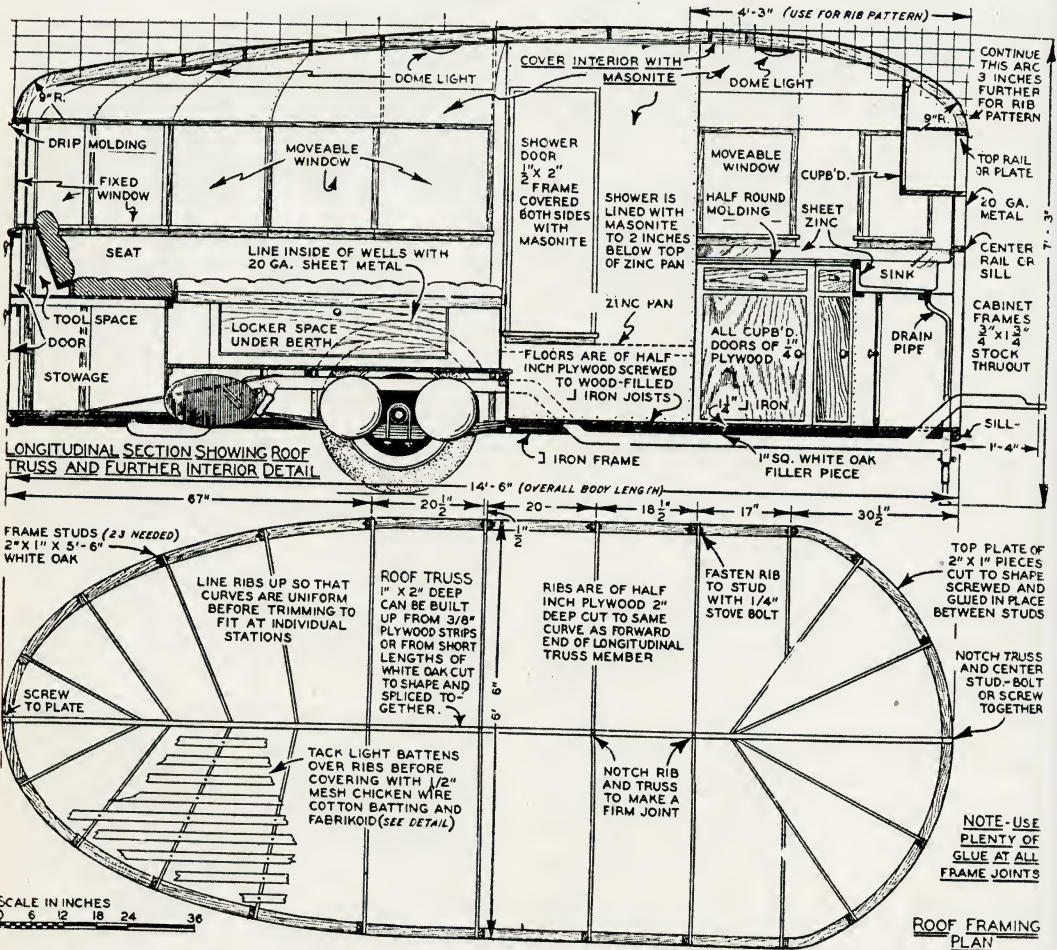
Mark off the points where the ribs join the truss member and with one-inch brads nail the assembly together. After the glue has

dried thoroughly, transfer the curves from the pattern to the rough truss thus formed and cut along the lines drawn. Short lengths of white oak cut to shape and spliced together can also be used for this truss piece.

The ribs are cut from plywood $\frac{1}{2}$ " thick and 2" deep, and are cut from the same curve pattern. It will be noted that the fore and after ends of the truss terminate in curves of 9" radius. Continue the 9" arc 3" longer than is required for the truss.

The next job is the framing of the windows. The inside edges of the sills are cut in a straight line while the outside edges take the curve of the body. There is sufficient space between the sills to pass $\frac{1}{4}$ " glass freely.

Our next step is to lay in the flooring. First



Studs, 23 in number, are bolted to chassis sill frame as shown in Part I. Front center stud, attached last, is not fastened to sill but to center rail because of trailer hitch. The pattern for the lengthwise truss of the roof is also used for laying out ribs. Tire pump develops air pressure in tanks under body to force water to the shower and sink.

Interior Cabinet Work Completes "Aloha"

cut strips of wood one inch square, as long as necessary, and bolt them to the angle iron joists using $\frac{1}{8}$ " stove bolts for the purpose. Lay $\frac{1}{2}$ " plywood on these joists and fit carefully around the studs. Line the inside of the wheel wells with 24-gauge sheetmetal and apply two coats of red lead.

To get an apparently seamless job for the sheet metal sides of *Aloha*, the following instructions should be followed carefully. The butted joints of all metal siding which in this case is 20-gauge sheet metal are set in cement, the proportions and mixing of which is as follows: To 8 pounds glazier's putty add 1 pound dry litharge and 1 pound dry red lead. Mix this to a stiff consistency with boiled linseed oil. Do not overlap the metal in tacking it down with the smallest nails possible. Spread cement on the stud faces before tacking. Before the cement begins to set, scrape off superfluous material until the seams are smooth.

The entire roof is covered with $\frac{1}{2}$ " mesh wire, shaped to the curves of thin battens nailed to the ribs. Cover the wire mesh with padding and then proceed to cut and fit the fabric top pieces which are tacked temporarily in place. Chalk marks are then made where the seams occur and the whole thing then pulled off and sewed together. Replacing the finished fabric, it is pulled and stretched and tacked permanently after which the drip molding is tacked in place.

The door is built up of two pieces of plywood $\frac{1}{2}$ " thick and nailed and glued together. Cut an opening 12"x15" and frame as shown in the detail. Cover the interior side with $\frac{1}{4}$ " presdwood or masonite and the exterior with 20-gauge metal. Cellulose glass is used where curved windows occur.

Work on the interior treatment may now be started. At this point all rough plumbing and electrical work should be installed. Automobile dome lights should be affixed to the ceiling as desired.

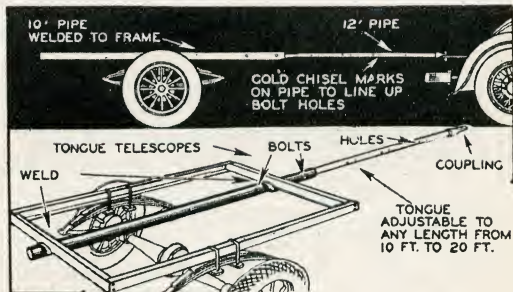
The job now is to install the shower and closet and wardrobe compartments. The shower pan is of sheet zinc 15" high with all joints well soldered. The interior walls of the shower are lined with masonite which laps the pan edges at least 2". The shower valve and head may now be installed and finished up. The shower door consists of a $\frac{1}{2}$ "x2" frame covered on both sides with masonite and hinged to swing in. The closet and wardrobe is formed of masonite on the exterior of frames only.

The cabinet work is next and since it already has a floor we build up the frames using $\frac{3}{4}$ "x1 $\frac{3}{4}$ " stock. All cupboard doors are of $\frac{1}{4}$ " plywood. The countershelf top is of $\frac{1}{4}$ " plywood covered with zinc. The sink is formed of this same material using care to see that all joints are well soldered and particularly the drain connection which leads to spill on the ground. The refrigerator is insulated with two layers of $\frac{1}{2}$ " celotex on the sides and four layers on the bottom. Cover sides and bottom with 26-gauge galvanized sheet metal. Provide the ice pan with a drain.

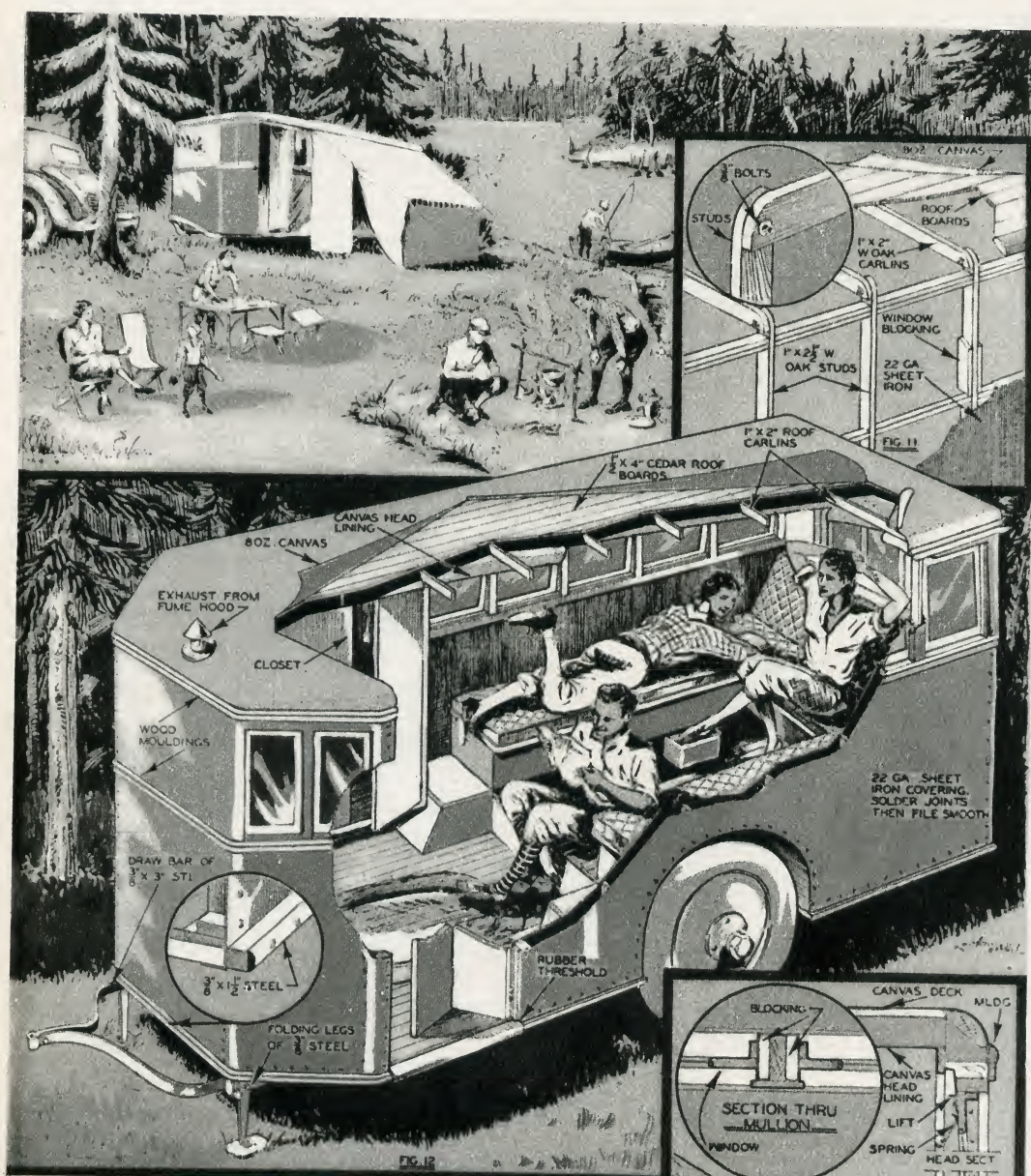
It will be noted on the Longitudinal Section that there is an oil or gas tank located back of the water tanks. This is a standard automobile gas tank. Pipes for filling the tanks should run to the exterior of the cabin walls. Cover the ends with radiator caps. The type fuel used for the stove will depend on the builders' choice.

Trailer Draw Bar Permits Carrying of Lengthy Loads

A VARIABLE draw bar that can be adjusted to any desired length will be found convenient for your trailer when carrying poles, lumber and other lengthy objects. Two bolts pass through the telescoping pipes permitting the tongue to be adjusted to any length from 10 to 20 feet. The larger pipe is fastened to trailer with U clamps while trailer hook is attached to the smaller diameter pipe. —J. E. Hogg.

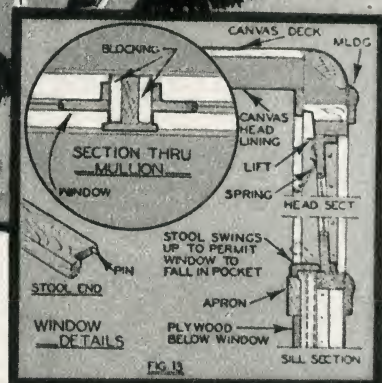


TRAILER CHASSIS DESIGNED FOR



How a sturdy, serviceable house trailer can be built upon the "heavy duty" chassis is illustrated above. From these details the builder can adapt the design to his own peculiar needs.

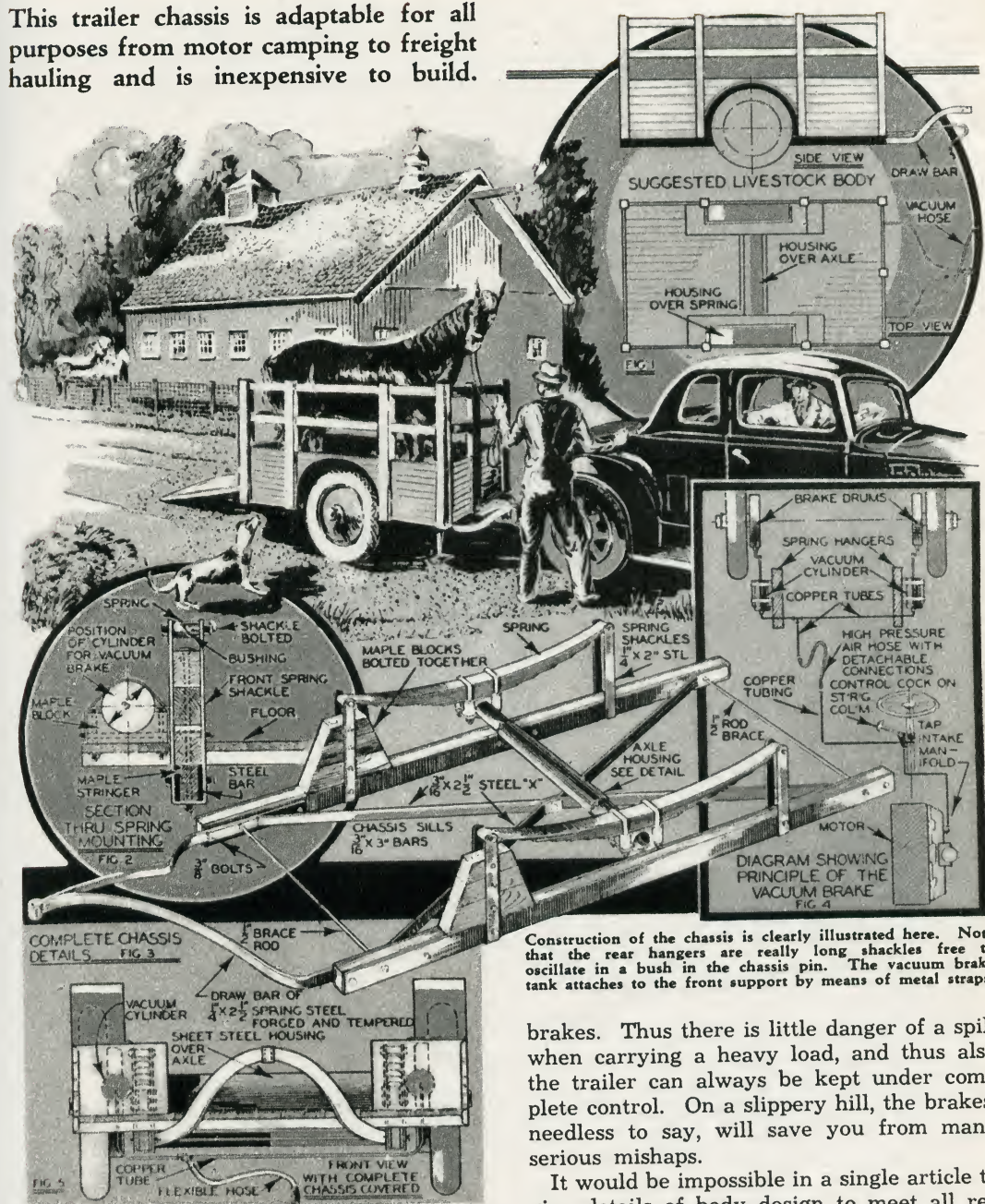
DAIRYMEN, truck gardeners, orchardists, motor campers—anyone with any hauling to do—will find in this trailer chassis just the thing to fill a long-felt need for extra freight space. With auto wrecking yards teeming with axles, springs and wheels which



The underslung trailer is recommended for use in districts where the roads are reasonably good. Of course, in heavy sticky mud the underslung trailer would be of little use because of its limited clearance, as would any other trailer.

ALL-PURPOSE USE

This trailer chassis is adaptable for all purposes from motor camping to freight hauling and is inexpensive to build.



The draw bar curves out and above to hook on the automobile at the height illustrated in this front view drawing.

can be bought for a song, it is as inexpensive a job as you could want.

Two outstanding features are to be found in this trailer: It is underslung, and it has

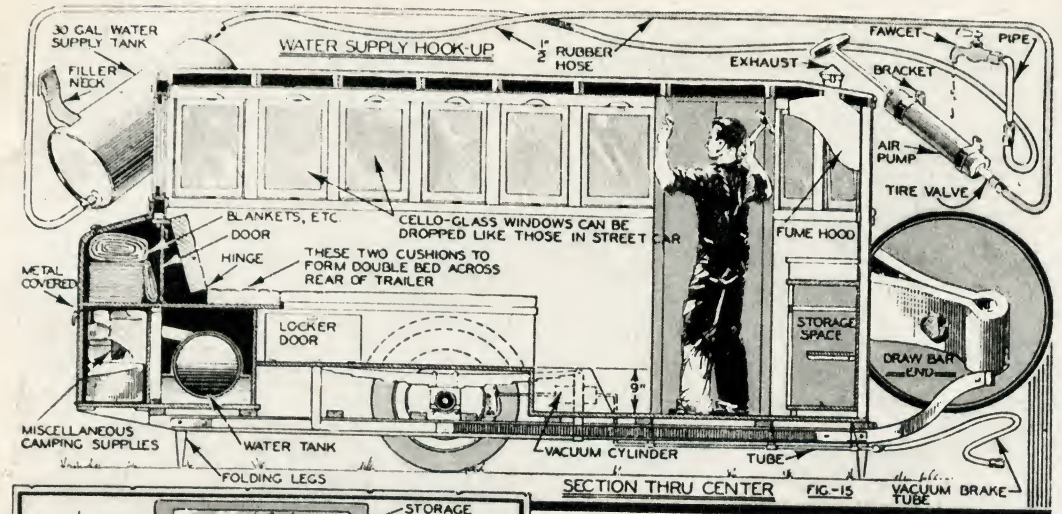
Construction of the chassis is clearly illustrated here. Note that the rear hangers are really long shackles free to oscillate in a bush in the chassis pin. The vacuum brake tank attaches to the front support by means of metal straps.

brakes. Thus there is little danger of a spill when carrying a heavy load, and thus also the trailer can always be kept under complete control. On a slippery hill, the brakes, needless to say, will save you from many serious mishaps.

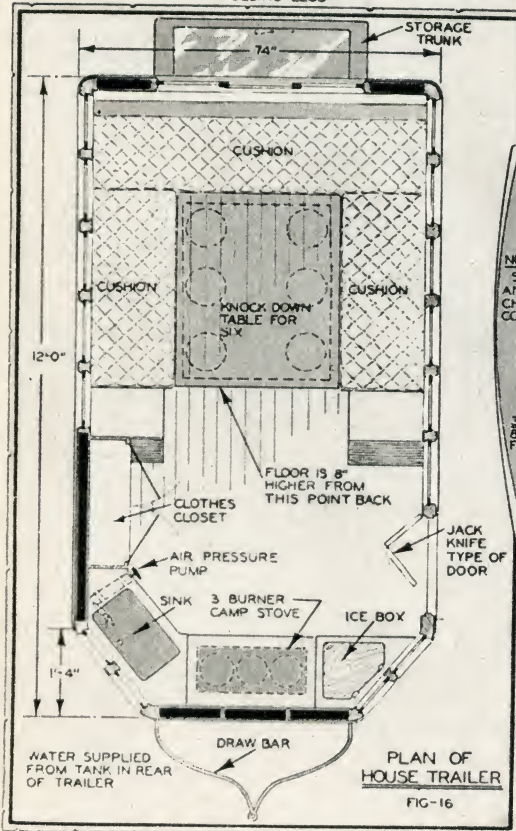
It would be impossible in a single article to give details of body design to meet all requirements, so this article centers on the essential chassis construction, leaving the style of body optional with the builder.

Instead of using a discarded front axle assembly as the basic unit, the underslung trailer is built up on a rear axle assembly

House Trailer Built On All-Purpose Chassis

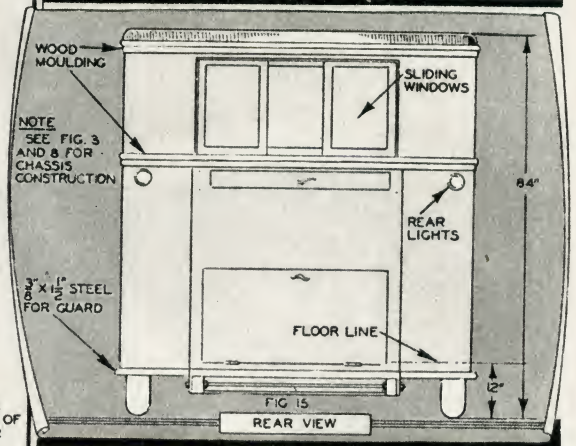


Ingenious layout of the house trailer permits convenient disposal of all luggage. Water is forced through faucet by means of an air pump installed as diagrammed above.



Interior of house trailer can be arranged most conveniently by following these plans. Three passengers can be carried with plenty of room for cooking, eating, and living.

of the full-floating type. Figure 6 illustrates this type of axle. The full-floating type axle is one from which the driving axles can be



Rear elevation of the house trailer. Rear lights are required by law, therefore plan on built-in stern lights.

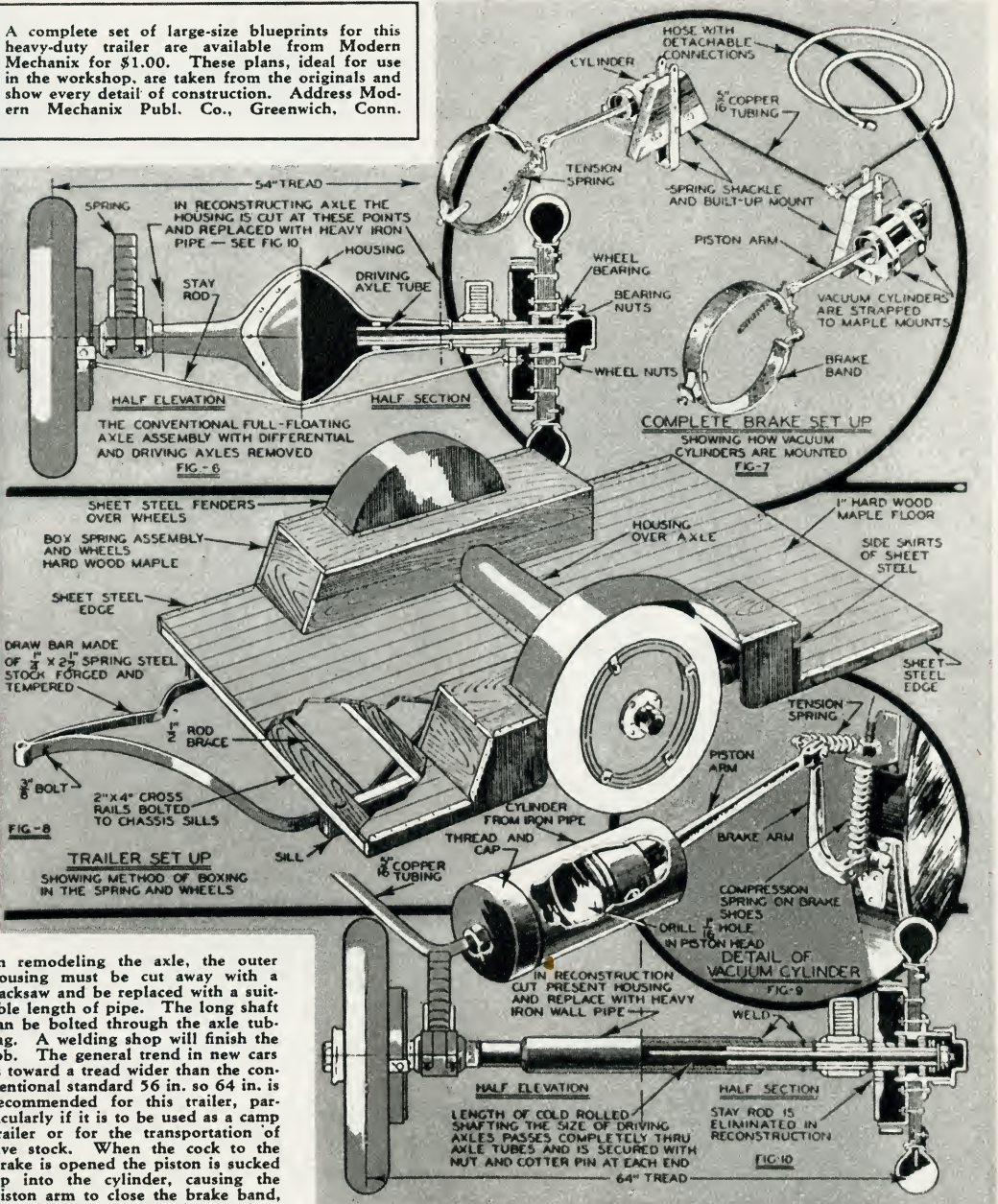
withdrawn without disturbing the wheel bearings. They can be acquired at any auto wrecking yard for a dollar or two.

The only parts of the rear axle assembly for which there is a "used parts" demand are the driving axles and differential parts. The rear axle assembly from early Cadillac models is particularly recommended for the under-slung trailer chassis.

Remodel the axle as illustrated in Fig. 10. The outer housing can be cut away with a hacksaw and be replaced with a suitable

Trailer's Axle Salvaged From Scrapped Auto

A complete set of large-size blueprints for this heavy-duty trailer are available from Modern Mechanix for \$1.00. These plans, ideal for use in the workshop, are taken from the originals and show every detail of construction. Address Modern Mechanix Publ. Co., Greenwich, Conn.



In remodeling the axle, the outer housing must be cut away with a hacksaw and be replaced with a suitable length of pipe. The long shaft can be bolted through the axle tubing. A welding shop will finish the job. The general trend in new cars is toward a tread wider than the conventional standard 56 in. so 64 in. is recommended for this trailer, particularly if it is to be used as a camp trailer or for the transportation of live stock. When the cock to the brake is opened the piston is sucked up into the cylinder, causing the piston arm to close the brake band, thus exerting the braking effect.

length of pipe. And the long shaft can be bolted through the axle tubing. Then the assembly can be towed to a welding shop for welding.

If brakes are to be used on the trailer—and they should—then the axle housing must be made rigid to the spring saddles. The saddle

can be made rigid by clamping the cap tightly and using cap-screws, or by welding the entire saddle to housing. In welding, care must be taken not to draw the temper from the spring leaves. It is best to find the exact location of the spring saddle with reference to the brake band, and then remove the spring

All-Purpose Trailer Features Safety Brakes

before welding. The emergency brake shoes serve no purpose on the trailer, so they can be removed from the brake drums.

After the axle has been prepared it is a comparatively simple matter to build the chassis. Figs. 2, 3, 5, and 8 show respectively the plan, side and front elevation, and the notations indicate the material used. Except for variations in length, the construction shown will serve for almost any body design.

The most important part of the chassis is the chassis sills. (See Fig. 3.) These are built up with a maple (or oak) center core 3" wide and faced on each side with $\frac{3}{16}$ "x3" steel bar. The overall width of the finished sill is the same as the springs of the trailer—probably 2 $\frac{1}{4}$ " or 2 $\frac{1}{2}$ ". The sketch shows the hanger built up with 3" blocks of maple, but one 9" block would serve as well.

Cross-rails of 1 $\frac{1}{2}$ "x4" hardwood are amply strong for most trailers, but if heavy livestock are to be carried it is better to increase the size to 2"x4".

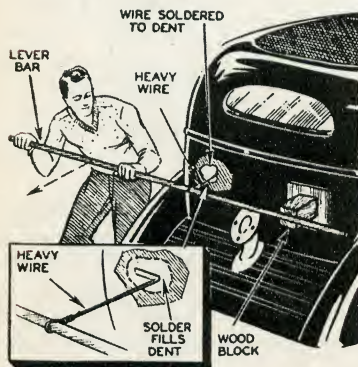
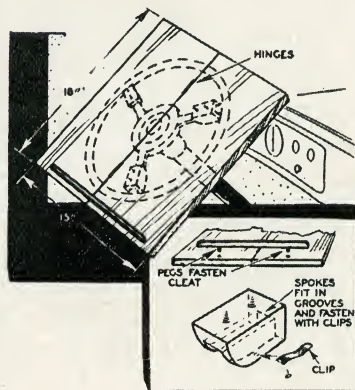
We will now take up the brake proposition. Figs. 4, 7 and 9 illustrate the theoretical working. Through a cock on the steering column, the vacuum created in the intake manifold when the motor is idling is communicated to two 3" cylinders. The pistons are literally "sucked" into the cylinders, and the brake bands are tightened by a rod leading to the brake arms. A 1/64" hole is drilled in each piston-head so that the vacuum is relieved when the cock is closed at the steering column.

Figs. 7 and 15 show how and where the cylinders are mounted on the trailer chassis. The cylinders can be made from a capped length of 3" pipe accurately machined inside. Any 3" pistons from an auto wrecking yard will serve. Of course, they must be fitted with good piston rings. If one can obtain a pair of discarded cylinders from a two-cycle type motor, these will serve without any remodeling. If ports restrict length of piston stroke, they can be filled in with iron cement.

HANDY WRITING DESK FITS OVER STEERING WHEEL

MANY uses will be found for this handy little hinged desk which can be slipped over the steering wheel, ready for use, in a jiffy. The hinged arrangement enables the desk to be stored in some odd corner of the car when not in use. Three grooved chocks, fastened to the back of the desk boards with screws, fit down over the spokes of the steering wheel. Spring clips swinging over the slots in the chocks hold the entire assembly snugly in place. The chocks must be arranged to fit. Since on many cars the horn button occupies the center of the steering wheel the chocks should be elevated so that they clear the button. The desk is ideal for use in cars with locking steering wheels.

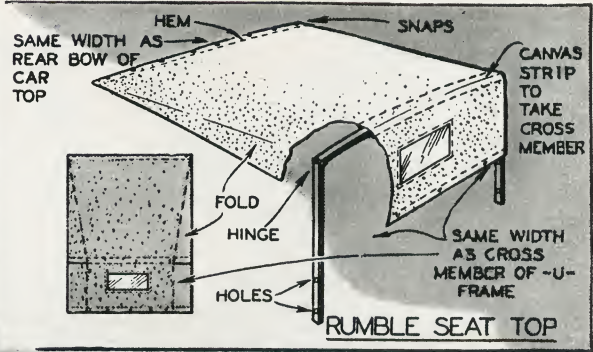
—J. A. Emmett.



Solder-Lever Kinks Removes Body Dents

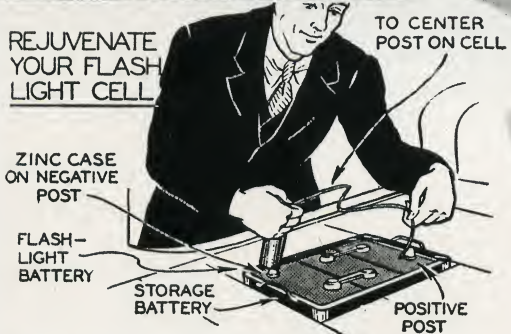
THE removal of dents in parts of the auto body which are not readily accessible from the inside presents a different problem. Remove enamel from the damaged area, sandpaper, and apply a light coating of solder. To the center of the hollow solder a strong wire bent at right angles. Form a hook in the free end of the wire and insert a bar to act as a lever; lifting on this should snap the dent back in place. Remove the solder with a blow torch and touch up with enamel. Dents in refrigerators can be repaired in the same manner.—Curtis H. Wilson.

MONEY SAVING IDEAS FOR AUTOISTS

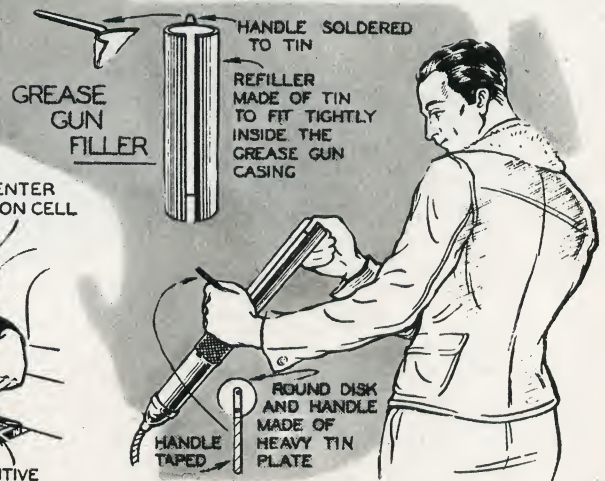


Canvas on frame makes removable rumble seat top.

REJUVENATE YOUR FLASH LIGHT CELL

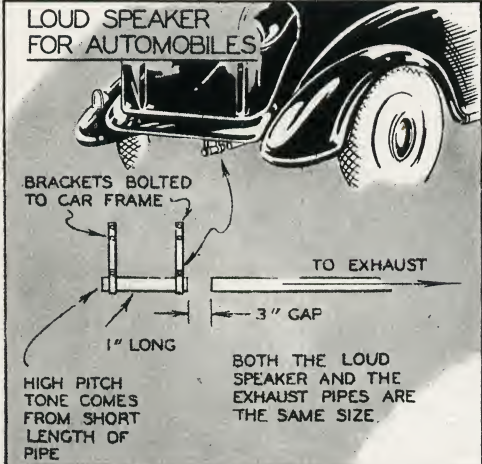


Dead dry cells can be pepped up with storage battery by holding as shown for 1 minute.



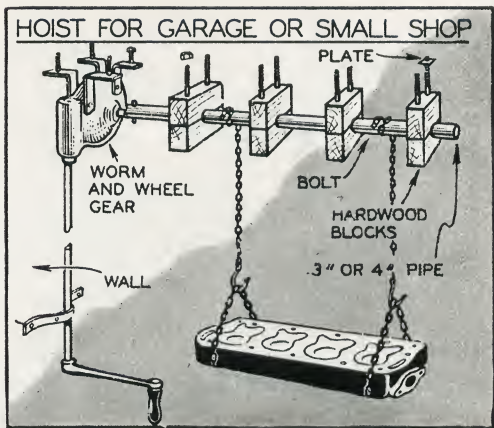
Pack grease in tube with wood paddle, slip refiller into barrel of grease gun, and push grease down into gun with round disk. Handle of disk is narrow to fit refiller slot.

LOUD SPEAKER FOR AUTOMOBILES



To get a deep, powerful note from your auto, mount one foot length of pipe in back of exhaust, leaving 3" gap. Air is sucked into loud speaker through gap by exhaust gases.

HOIST FOR GARAGE OR SMALL SHOP



Mount worm type steering gear housing on roof of shop. Attach crank arm to worm shaft, and 3" pipe to large gear shaft. Fasten lifting chains to heavy eye bolts in pipe. Hoist will easily lift even heaviest engines out of car.

BOAT TRAILER BUILT



The boat is slid off the trailer into the water in the manner illustrated above. When it is desired to put the boat back on the trailer the latter is run out into the water to the necessary depth and the boat floated onto the cradles. Correct position for best equalization of weight is indicated by markings on the sides of the boat. When loading the boat on land you need only lift the craft a few feet to set it in the cradle.

A TWO-WHEELED boat trailer is the best solution of the problem of transporting a medium-heavy boat, say one weighing between one hundred and three hundred pounds. The boat does not have to be lifted more than three feet from the ground, which is not much of a strain on two men, even if the boat weighs 300 pounds.

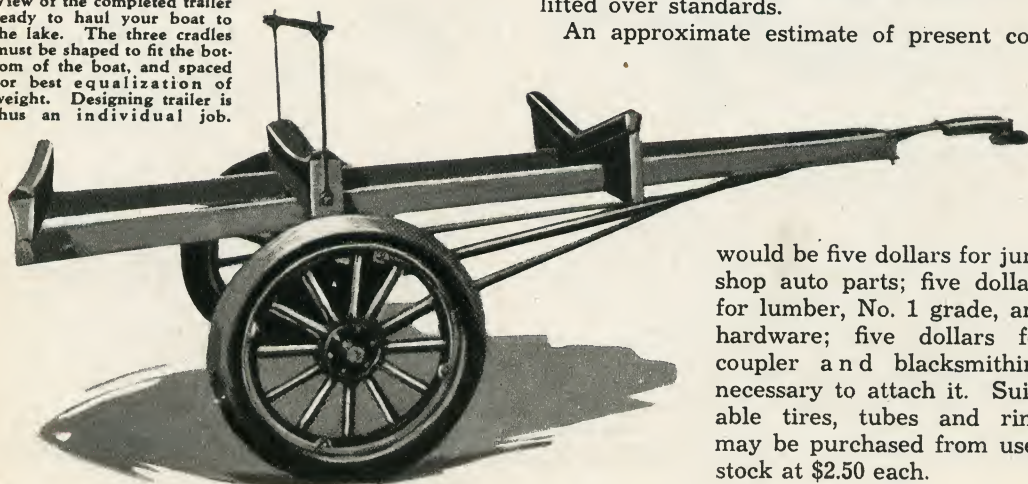
If the boat is heavy, the trailer can frequently be backed into the water, so that the

boat may be slid off into the water with a minimum of exertion.

Made from parts of an old T-Model Ford and a few dollars worth of lumber and hardware it is preferable to most boat trailers I have seen on the market. For instance, having used a rear axle (stripped of the gears) it has sufficient weight to insure good road holding qualities with a light boat. It tracks perfectly at any speed, is padded and form fitted to the craft, and does not have to be lifted over standards.

An approximate estimate of present cost

View of the completed trailer ready to haul your boat to the lake. The three cradles must be shaped to fit the bottom of the boat, and spaced for best equalization of weight. Designing trailer is thus an individual job.



would be five dollars for junk shop auto parts; five dollars for lumber, No. 1 grade, and hardware; five dollars for coupler and blacksmithing necessary to attach it. Suitable tires, tubes and rims may be purchased from used stock at \$2.50 each.

WITH AUTO PARTS by DICK WOOD

If preferred, a trailer may be built over a front axle, after the manner of the commercial job, illustrated herewith. It will be lighter and perhaps entirely satisfactory for light boats, besides being more adaptable for a camp, or general purpose trailer, by putting a bed on the frame work.

However, the trailer described is particularly suited for boats 12 feet or longer, and, being built especially to fit one boat, it will prove more satisfactory for that purpose than a combination for dual purpose trailer.

First, strip the rear end of the Model "T" housing of gears. Before buying note that the axle is in good condition and the wheels unwarped and free running. An extra drive-shaft housing will be needed to provide sufficient length. Have it cut in the right place, after determining the length of your trailer, and have a blacksmith devise a means of attaching your coupler device.

The cheapest way around this problem is to flatten the housing where cut, and drill a hole for a $\frac{3}{4}$ -inch bolt. However, one of the patented couplers are much more satisfactory, and may now be secured for as little as three dollars. The coupler will need to be welded to the end of the housing.

The two housings may be bolted together

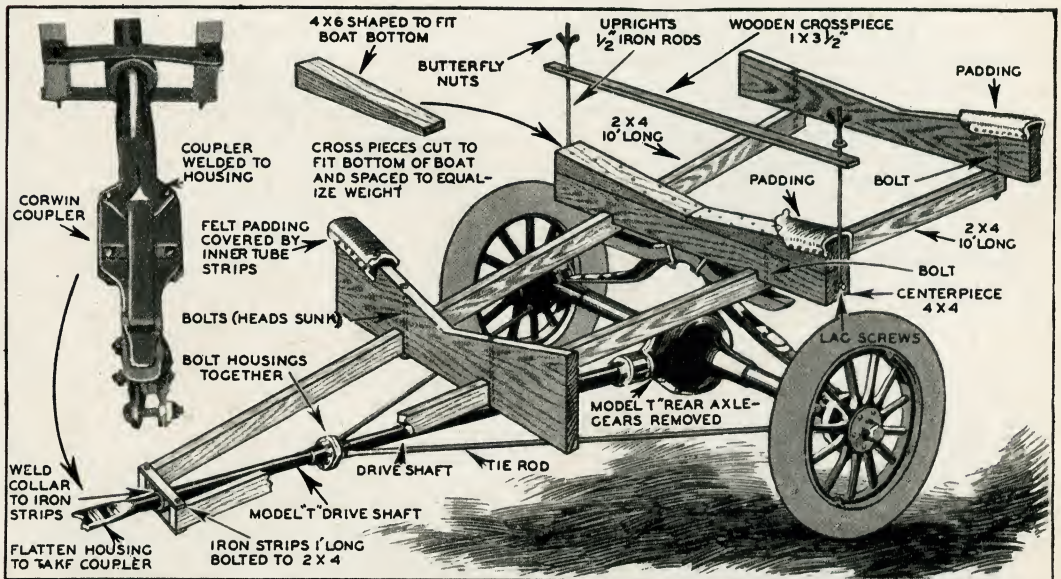
at the point where the tie rods come together. While the trailer can be built without reinforcing this point, it is undoubtedly the weakest part of the trailer; and if a heavy boat is to be hauled, it should be strengthened by iron strips, top and bottom, bolted on. Quarter-inch holes through the housing will not weaken it.

In order to allow for the play of the spring, it will be noted that a truck bearing has been used for a collar over the housing to support the front end of the frame work. This must be fitted on before the coupler is attached, of course.

Iron strips about a foot in length are welded on, top and bottom, after bolt holes have been drilled in each end of the strips. Assuming they have been cleaned of rust and painted with a good metal paint, the running gears are now ready for the wooden frame work.

First, 10-foot 2x4's are bolted down, front and rear, V-shape, as the foundation. Naturally, they should be seasoned, straight grained lumber, free of knots. Allowance may be made for bowing in toward the front, if desired.

The cross pieces, cut to fit the boat bottom, should be spaced on the trailer to fit the boat, with a mind toward the equalization of



Since it is impossible to follow any definite specifications for the cradle due to the variation of hulls of various boats the builder must depend somewhat upon his own ingenuity. The chassis is constructed from the rear-end axle, driveshaft and tie rod assembly, all of which are salvaged from a model T car. A commercial coupler or homemade one can be used with trailer.

Dimensions Are Adjustable To Fit Boat

weight. It happens my boat is a canvas covered V-bottom hydroplane, hence the cross pieces are accurately formed from patterns to fit the boat perfectly. All that is necessary is to have a mark on the side of the boat, to match in line with upright rods. This will insure the boat being adjusted properly on the trailer.

The cross pieces are bolted down, through the 2x4's, the bolt heads sunken. Then, if the boat is a fine cedar one, or has an iron or canvas bottom, the pieces should be padded to minimize damage by friction. Use felt padding and cover it with strips of inner tubes, tacked down with roofing nails.

Dimensions Adjustable to Fit Boat

The center piece was constructed from 4x6 and 4x4 pieces. One 4x4 was bolted down; then to fit the boat, two pieces, 4x23 in. long, tapering from three inches thick at one end, to one inch at the other, were sawed out and nailed to the 4x4, thick ends to the outside. The front cross piece is 42 inches, the center 46 and the rear 48 inches in length. Of

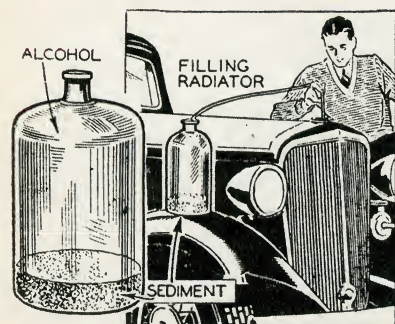
course, the bed may be wider to fit wider boats.

The upright ½-inch iron rods, adjusted for the height of the boat, are attached to the center cross piece with iron lag screws, through eyes, so the rods may be turned down to facilitate loading of the boat onto the trailer. I am using a wooden cross piece, 1x3½ inches, for holding the boat down, but it has a tendency to bow up in the center when the butterfly nuts are tightened down. An iron strip would be preferable, and less unwieldy than a 4x4, neither of which would bow up.

It is only a moment's job for two men to lift a boat onto this trailer, and strap it down with the cross piece. There are no standards to lift it over, so that two men can readily lift any ordinary portable boat onto the trailer bed, which is only a few inches above the wheels. A trailer so designed that the boat must be loaded in from rear end is much less convenient.

There is no pin in the Corwin coupler so that the trailer may be readily unhitched, without tools, for quick turning around on a narrow road.

Radiator Alcohol Easily Filtered For Re-Use



MANY autoists would like to save their radiator alcohol each spring. It is usually so dirty and discolored, however, that it is considered worthless.

When draining out the winter alcohol from the radiator this spring, place the solution in gallon glass jars or in the more common oil cans having good screw tops. Be sure that the containers used are air tight, or the alcohol will evaporate away during the hot summer months.

The sediment in the solution will slowly settle to the bottom of the can, leaving a clear solution of alcohol and water. This must be syphoned into the radiator next fall, in order that the sediment is not stirred up by the pouring.—John Barfay, Jr.

Kerosene Removes Water In Engine

WHEN the ignition system of an automobile engine becomes wet either during a storm or when the car is washed, trouble in starting is often encountered. Kerosene poured over all wires, distributor cap, and spark plugs will remove the water rapidly, with little danger of fire. An oil can containing the kerosene can always be carried in the car, clamped to the dashboard, or kept with the tools.—Carl L. Albers.



CAMPING TIPS FOR THE TOURIST

THE few short weeks allotted to most of us for a vacation period can be made much more enjoyable, should we choose auto touring, if we carefully plan ahead of time for the needs of the trip.

These suggestions for auto tourists, as well as a few "do's" and "don't's," have all been tried out and approved by experienced campers.

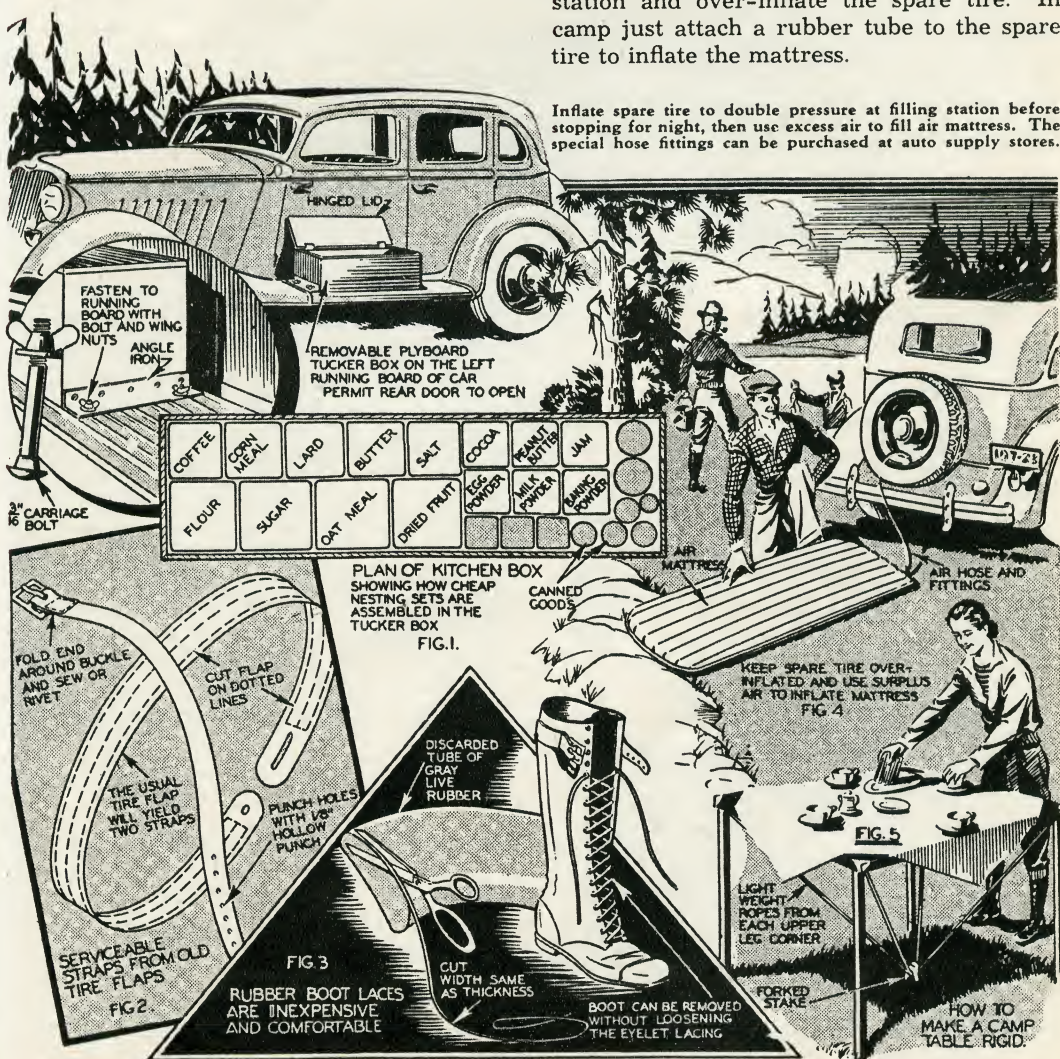
The larger or "tucker box" is perhaps the most important part of the camping equipment. Always carry at least a three days'

supply of staple groceries, well assorted.

Long straps always come in handy when tying down the luggage. They can easily be cut out from the "furry" flaps used inside some auto tires. Buckles can be bought at any hardware store, and sewed in place.

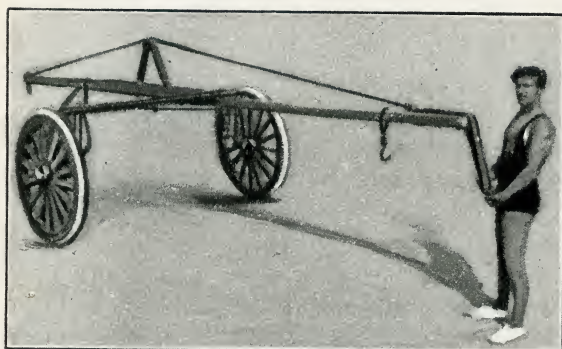
High-top hiking boots are quite a nuisance to get into and out of. To avoid the need for withdrawing the lace from the lower eyelets, cut rubber laces from an old tube.

The air mattresses used by many campers are not at all easy to inflate with an air pump. Before camping for the night, stop at a filling station and over-inflate the spare tire. In camp just attach a rubber tube to the spare tire to inflate the mattress.



Every motorist, tourist and camper will find these suggestions helpful when planning a trip. The runningboard cabinet provides a systematic arrangement for food stuffs. A card table anchored with guy ropes will prevent accidental tipping. Serviceable straps for emergency use can be easily cut from old tire flaps. Use inner tubing for boot laces by cutting it into $\frac{1}{8}$ " strips.

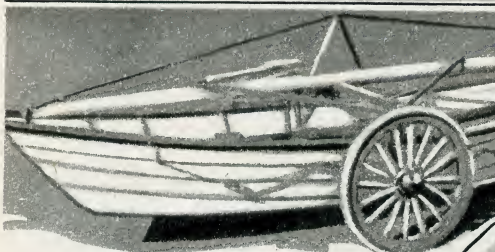
Build This Heavy Duty Trailer



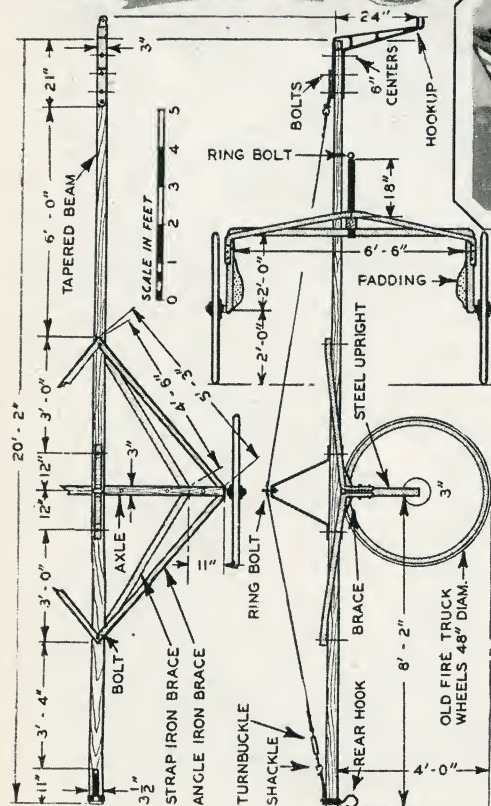
Boats weighing up to 600 pounds can be launched or taken out of water in 10 seconds with this easily built suspension trailer. Tremendous leverage of beam allows a man to raise a heavy boat into position.



Here is the completed underslung boat trailer attached to the emergency car of the Santa Monica, California, Lifeguard Service. One man can easily couple it to car. It rolls on large auto wheels.



A 20-ft. Coast Guard boat suspended from the trailer. Steel cable carries most of 600-lb. load, permitting small beams.



Upper left: Completed suspension boat trailer is very light, and easily pushed along beach. Hookup is held by man.

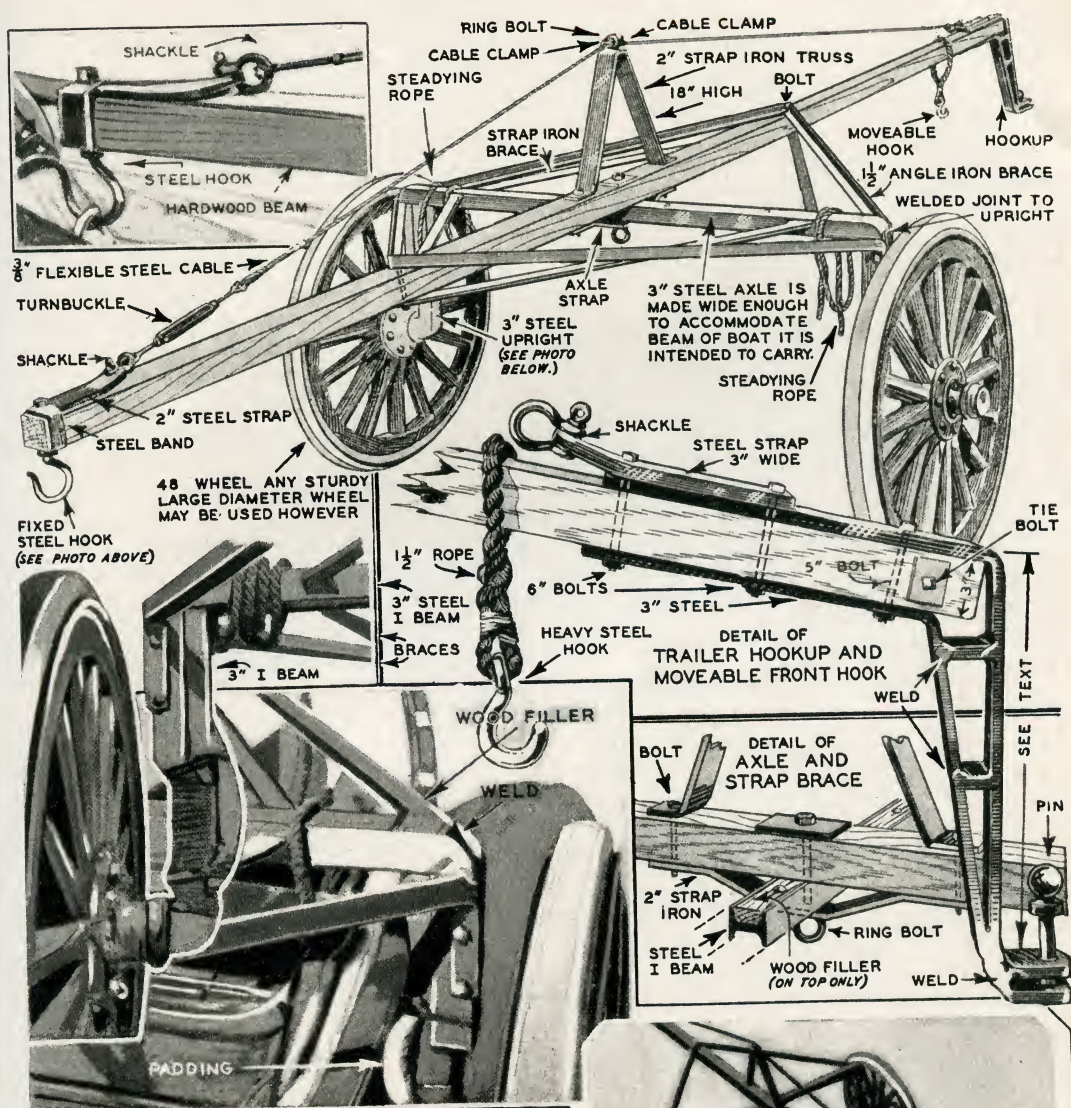
A CALL comes in to life guard headquarters that a small boat is in distress off some lonely spot on the sea beach. Lives are in danger, and every second counts. A seaworthy patrol boat must be picked up on a carrier on a moment's notice, towed by automobile to a point on the beach near the scene of the accident, and hurriedly launched in the surf.

George Watkins, chief of the Santa Monica, California, Life Guard Service, solved this problem by designing the suspension boat trailer. With it a 20-foot dory or skiff weighing more than 600 pounds can be lifted from the ground or shallow water into carrying position in less than 10 seconds by ONE man! The launching of a boat requires even less time.

The suspension boat trailer is, primarily, a long, reinforced wood beam fixed upon a

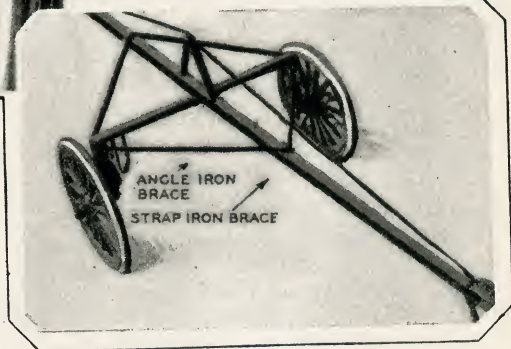
For Your Boat

by
PAUL W. GARTNER



Close-up view showing steel framework of trailer. Framework is padded to prevent boat from being scratched. Fire engine wheels are used here, but large auto wheels will do.

steel axle which has been raised sufficiently high above the wheel hubs to clear the ends and freeboard of the craft to be carried. The rig is simply rolled above the boat, and a fixed hook at the rear extremity of the beam is joined to a steel ring or loop of heavy line attached to the stern of the craft. The leverage of the beam makes it practical for a man of average weight to raise the stern of the boat. Then a moveable forward hook is readily fastened to a ring in the bow, and the lift has



Another view of trailer frame, showing how steel braces from beam to axle add rigidity to the suspension assembly.

BOAT TRAILER IS IDEAL FOR BEACH USE

been accomplished in a very few seconds. Lines dropped from the axle are tied to the gunnels to snub side motion. The weight is so balanced that a single man can raise the forward end when hooking the trailer to an automobile.

Since this carrier was designed to accommodate a dory with 33" ends, a 25" freeboard, and 72" beam, it has an "I" shaped axle, 3" deep and 78" wide, approximately 24" above wheel hubs. Wheels 48" in diameter are used. This permits the dory to ride about 15" above the ground. The axle uprights, also of 3" steel, are padded to protect the boat gunnels.

The longitudinal beam is held true with the axle by two sets of braces around 5' in length. From the elbows of the axle two pairs of 1½" angle irons extend to the upper surface of the beam. Approximately 11" inside the axle elbows two pairs of 2" strap irons reach to the under side of the beam. Bolts secure these sets of braces to the shaft and to each other. The mid point of the axle is fixed to the beam by a bolt or ring bolt and an additional strap iron brace extending both directions on the under side of the beam from the under sur-

face of the axle. The grooved upper side of the axle is filled with wood in order to afford a flat surface for the beam rest.

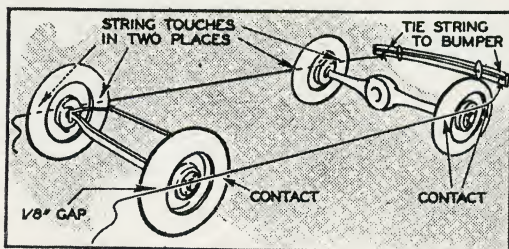
The shaft is 20' 2" in length, and rests upon the axle at a point 11' 9" from the hookup. A semi-hardwood is suitable material, since the ¾" flexible steel cable assumes most of the stress. From a shackle fastened to the hookup iron the cable passes through a ring set at the apex of a triangular truss, which is approximately 18" above the shaft. At the rear extremity of the beam the cable is shackled to a steel band which is a part of the fixed hook. A turnbuckle provides a means of obtaining the proper tension, and cable clamps on either side of the apex ring prevent slippage.

The front steel hook is fastened to a 1½" line in order that it may be moved handily along the beam to accommodate boats of varying lengths. Since the supporting shaft rides approximately 4' above the ground, the hookup will have to drop in the neighborhood of 24" if it is to be coupled with an extension from the frame of the average automobile.

Check Front Wheel Alignment To Reduce Tire Wear

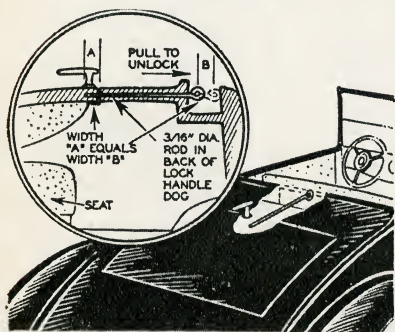
MIS-ALIGNMENT of front wheels means hard steering and excessive tire wear. To check "toe-in," jack up front axle and spot tire with chalk to mark high spots due to wheel wobble. Lower the jack so that high spots are at the bottom. Stretch string across wheels on one side just under the hub caps and adjust to make front wheel parallel with rear. If the "toe-in" is correct, string on other side will touch front tire at two places.

—R. F. Jennings.

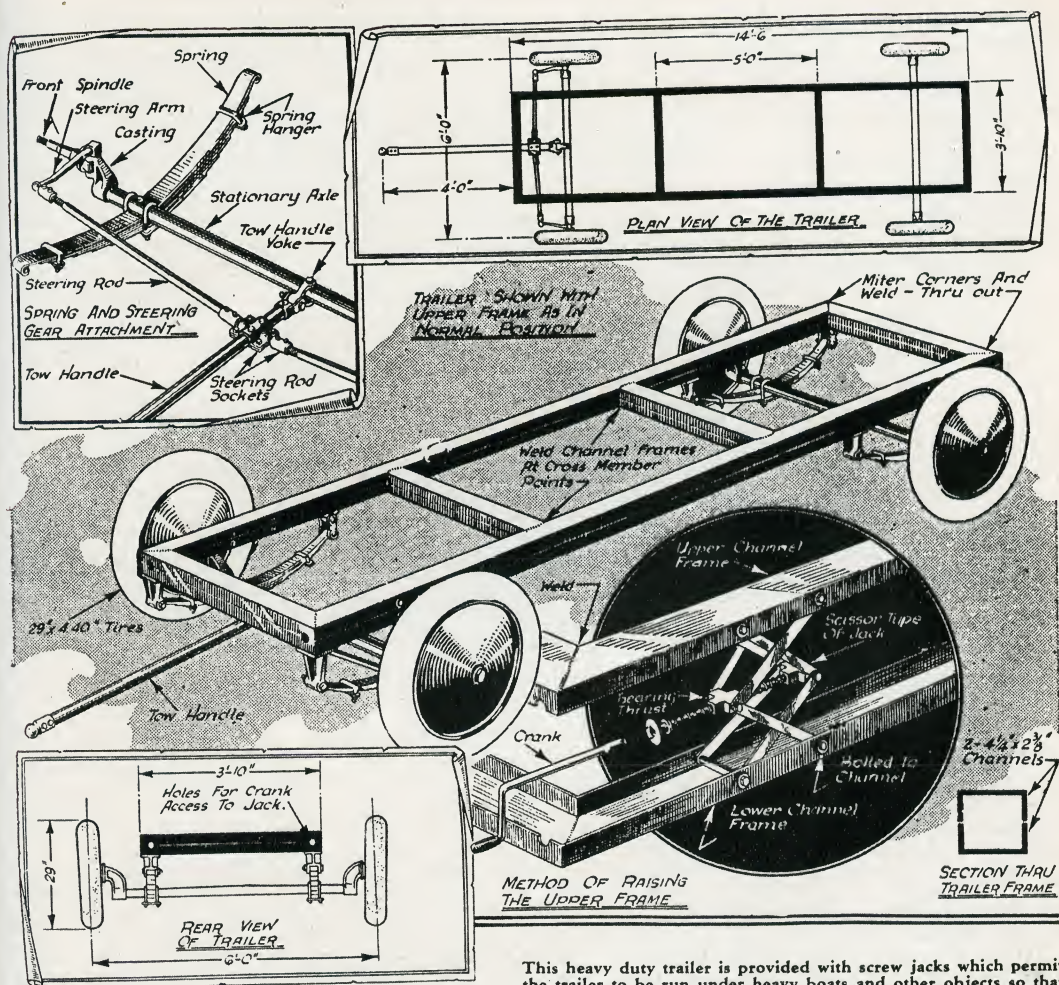


Rumble Seat Locks Without A Key

CONSIDERABLE trouble in opening the key type of rumble seat lock is often encountered, especially in winter when ice forms in the key hole. With this simple locking device, the rumble seat door can be instantly locked or unlocked by operating a lever from inside the car. Drill through the back of the seat for a 3/16" diameter steel rod. Use a rod long enough so that when pulled forward till it touches the seat back the other end will just clear the rumble seat door lock. When pushed back, this rod engages with the lock, effectively holding the door in position.—F. H. Gayette.



Heavy Duty Trailer Is Self-Loading



This heavy duty trailer is provided with screw jacks which permit the trailer to be run under heavy boats and other objects so that they can be easily raised by two men. Chassis is of channel iron.

by E. D. HILBURN

WITH this trailer you can trundle heavy boats to the waterside for launching, or you can use it about the farm for picking up rack or side bodies, thus making a wagon of it.

The central idea lies in using a double channel frame with screw jacks in each corner. A frame rise of about 10 to 12 inches is thus gained.

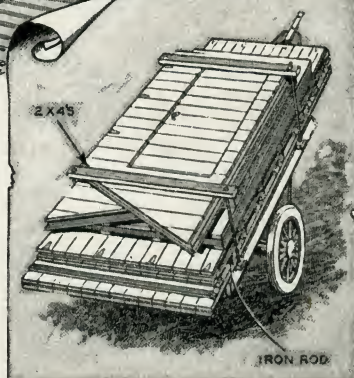
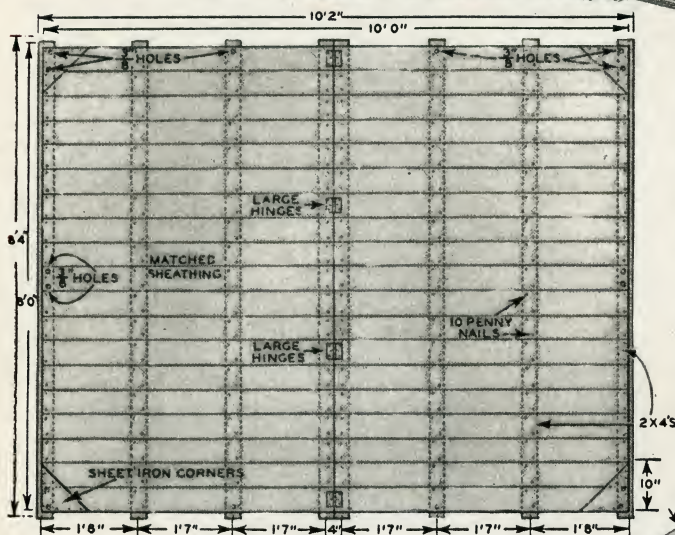
Suppose you have a boat about to be loaded. You shift the weight off the keel blocks and put cross timber under her, then you run the trailer in, and instead of letting the boat down a grunt at a time, you run up the frame of the trailer, take the load off the cross beams, and lower boat after pulling blocking.

The wheels are standard front wheels of Model A Ford cars. There will have to be special crucible steel spindles made with a little offset so they can be underslung on the tubular axles, which can be $2\frac{1}{4}$ " seamless steel tubing of heavy gauge. The front wheels employ standard spindles, and the tie rod hook up is as shown in the drawings.

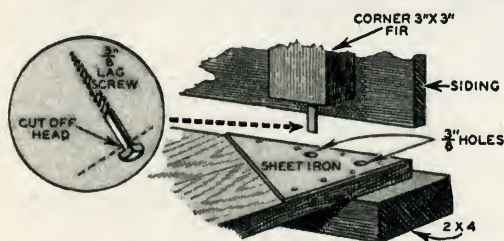
Spring casters must be cast, and bolted thoroughly to the $4\frac{1}{2}$ "x $2\frac{3}{8}$ " channels. Then the usual shackles are installed.

The jacks are removed from their bases and through-bolted to the channel in the manner shown in the drawing. The ends of the mitered channels are counter bored for the end of the screw shaft. Such a trailer will hold about 2 to 3 tons safely.

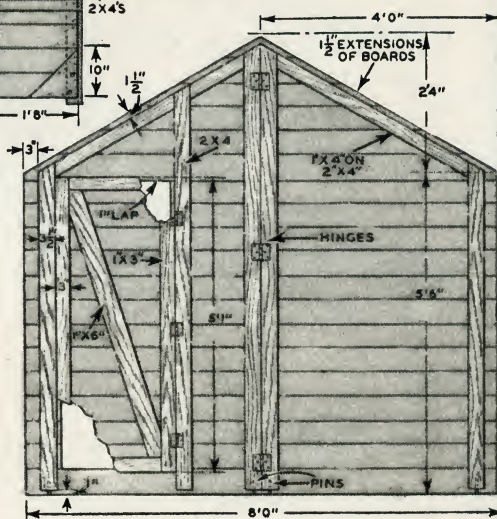
TRAILER CARRIES PORTABLE



Units of house are transported on trailer to camp site. 2x4's underneath and on top are joined by iron rods to clamp the units into an easily shipped bundle.



Assemble elements of floor and side as shown then cut down middle to form two hinged halves. Lag screws in side are set in $\frac{3}{8}$ inch holes in floor to hold the house in place.



THIS sturdy cabin has been designed for the fellow who wants to go somewhere and take a good shack along with him. It has the advantage that it can be slung on a trailer and taken wherever you can drive your car.

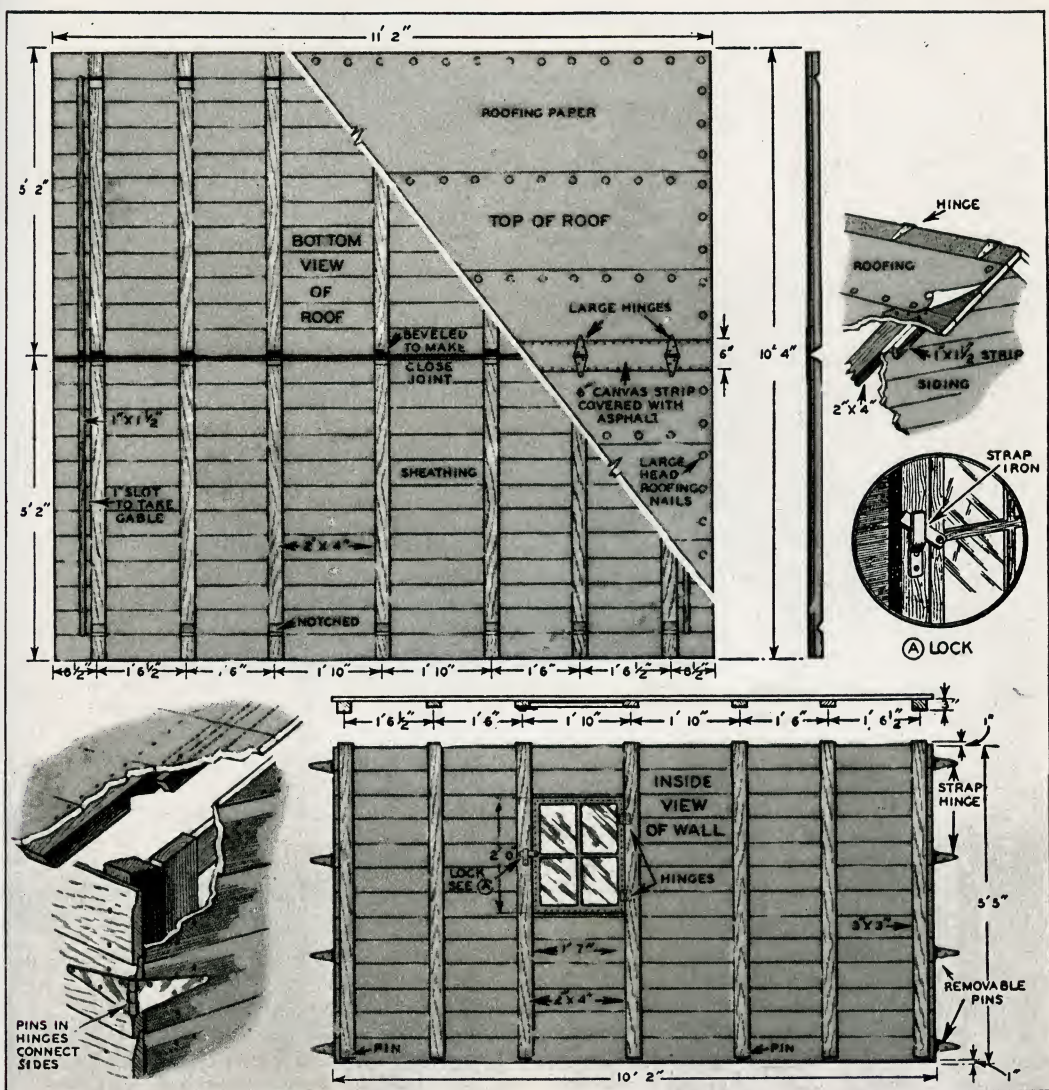
Once on the camp site, whether for 24 hours or a month, you flip the sections together and there before you stands a cabin you'll be proud of.

Beating rains can't bother; the floor won't

sag, and with windows on each side you can regulate the ventilation to suit. The floor space is ample for 2 double beds, chairs, a small table—even a topsy stove for chilly weather. Let's look into the business of building it.

Briefly, this cabin is divided into 6 units—the roof, the two sides, the two ends and the

KNOCK-DOWN CAMP CABIN



Plans for top and sides. Roof has notches in rafters to join with studding in the sides. Join hinges with pin to hold sides.

floor. The floor, roof and ends are divided and hinged along the middle so that they may be folded to half their open area. A unique detail of locking the corners is by means of hinges screwed to the adjoining surfaces.

To take the cabin apart, the center hinge pins are removed, thus making this step simple and effective. Pins made from lag screws with the heads sawed off after being placed, extend an inch below certain studding and the corner posts. These protruding pins fit into holes in the floor, locking the floor and side walls.

To insure a tight fit at the ridge of the roof, a strip of canvas is nailed down under the hinges and over the roofing (if roofing is used) and this coated with hot asphalt.

You'll find it advisable when making the floor to lay out your materials, then nail them together. When this is done, cut the piece down the center and apply the hinges as illustrated in an accompanying drawing.

Each side is alike. For one, lay the 2 by 4-inch pieces which are 5 feet, 5 inches long on a smooth surface and after spacing them, nail on the drop siding. Note that the siding

BOAT TRAILER CHASSIS WILL HAUL CABIN

extends 1 inch past each corner post. These posts are 4 by 4 fir planed down to 3 inches square for less weight.

The most practical way to install the windows is to hinge each sash as shown, cutting the opening through the side 1 inch smaller on each side than the sash.

To make each sash fit quite snugly, cut and tack rubber strips (cut from an inner tube) around the four sides of the openings so that when the sash is closed, its four sides will press against the rubber.

To finish the sides, fasten the four hinges to each corner, evenly spaced as shown. As the accompanying sketch shows, the side studding is offset upward 1 inch. The projection of this studding at the top of the sides fits into the notches in the rafters of the roof and locks studding and rafters together.

At this point turn the $\frac{3}{8}$ -inch diameter, 4 inches long, lag screws into the corner posts and the two 2 by 4-inch studs. Turn the screws in until 1 or $1\frac{1}{2}$ inches besides the heads protrude, then cut off the heads with a hack saw.

With these pins in place, stand one side in place along one side of the floor and after

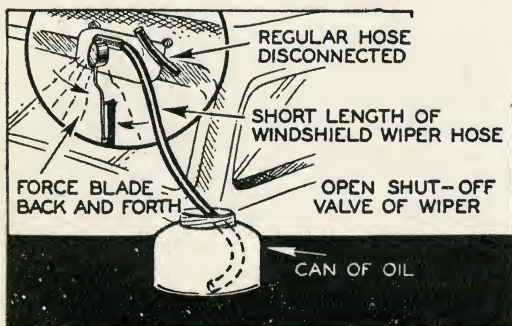
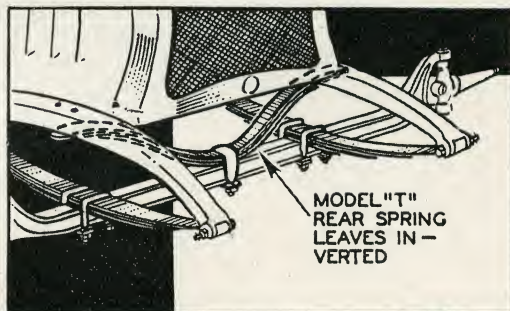
making sure that the side is properly aligned, mark around the pins, then lay the side away and bore $\frac{3}{8}$ or $\frac{7}{16}$ -inch holes on these spots at least 1 inch deep for the pins to fit into later. The other side is made in the same way but reversed.

The illustration of the roof shows partial views of both the top and bottom. The rafters are 2 by 4-inch pieces spaced to coincide with the side studding. After completing the roof, turn it over and set it at the angle it will assume when on the cabin. In this position nail roofing paper, then fasten the canvas strip along the ridge with a little slack at the actual ridge. Use large head roofing nails for this. To finish, heat asphalt until it pours, then spread it over the canvas. When cold, fasten the hinges, one to a pair of rafters as shown.

These various units are best transported on a trailer. You can get Ford front wheels and axle and make one for this special purpose at very low cost. To bind the units it is suggested that you obtain two 2 by 4-inch pieces of suitable length and four long bolts, say $\frac{3}{8}$ -inch in diameter, and use the method shown.

EXTRA SPRING ADDS TO CAR'S COMFORT

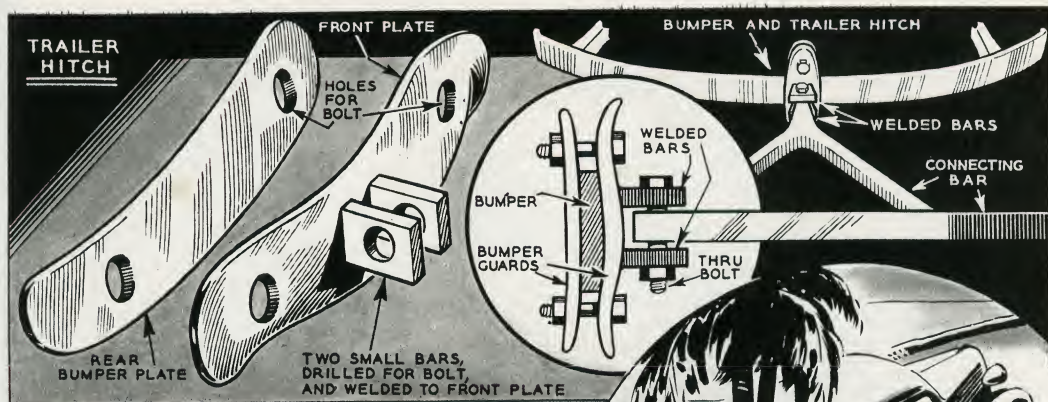
WHEN front springs of a car sag, causing hard steering and bumpy riding, this easily installed auxiliary spring will cure the trouble. Remove the two largest leaves from the rear spring of a Model T Ford, then take out the next three. Raise the car frame by jacking up the front bumper, then place these in the position shown in the drawing at right, and bolt on the U-clamp.—C. S. Sikon, Chicago, Ill.



Oiling Sluggish Windshield Wiper

RATHER than take apart your vacuum windshield wiper for its periodic oiling, try this simple kink. Remove the regular hose from the wiper, and slip in its place a short length of tubing. Allow the end of this tube to dip into your can of oil, open the shut-off valve, then force the wiper blade back and forth a few times to suck in the oil. Every part of the wiper will be oiled by this method.—E. J. Novak, Omaha, Nebraska.

Bumper Guard Forms Novel Trailer Hitch



Fashioned from a chrome bumper guard this handy trailer hitch is capable of towing any light trailer. A pair of metal plates welded to the front guard plate permit coupling of trailer to car.

DUE to the streamlined design of the modern car it is very often a rather difficult job to provide a suitable coupling for pulling a light trailer. An inexpensive bumper guard which can be purchased at any auto supply store offers a satisfactory solution to the problem. With the attachment described here a neat and serviceable hitch can be constructed in many cases for less than one dollar including the cost of welding.

A bumper guard that will match those already on the car should be selected. Secure a length of steel plate about $\frac{1}{4}$ -inch thick and cut two pieces which will measure about 2 inches square. In the center of each piece drill a hole large enough to pass a large carriage or stove bolt; the bolt serving as the hitching pin when the trailer hitch is completed.

On the front bumper guard mark the place where the two metal squares are to be welded allowing sufficient space between them for inserting the trailer connecting bar. After the correct space has been determined take the parts to a local welding shop and have them assembled. Be sure that the welding job is made securely so as to prevent any possible loss of the trailer by the metal bars breaking loose.

The completed hitch is now ready to be attached to the car's rear bumper. In mounting it in place be sure that lock washers are slipped over the bolts before tightening them up. This will prevent the swaying vibrations of the trailer from loosening them.

Torch Loosens Rusty Bolts

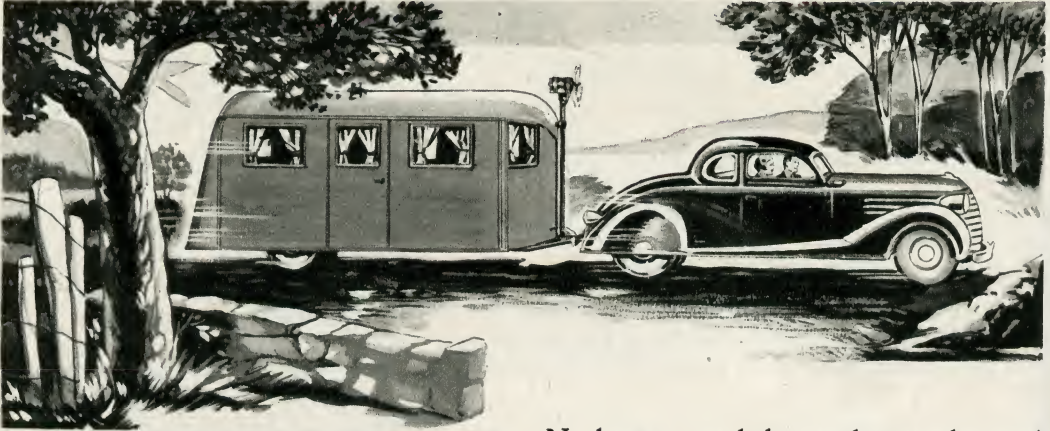
TRAILER chassis or spring bolts that have rusted fast and need replacing, but which refuse to respond to a wrench can be removed if they are first heated with a blow torch. Direct the flame on the nut until the metal has expanded away from the bolt. A tight-fitting wrench should be used when working on the heated nut to prevent damaging the softened metal.

Since the binding of nut to bolt is usually due to a thin layer of rust which forms on the threads it is possible in some instances to free the parts by applying kerosene to the bolt and allowing it to penetrate through the threads. In stubborn cases both the kerosene and blow-torch treatments should be employed.



Trailer spring bolts which have rusted fast can be removed with ease by simply heating as shown.

A WIND GENERATOR PLANT



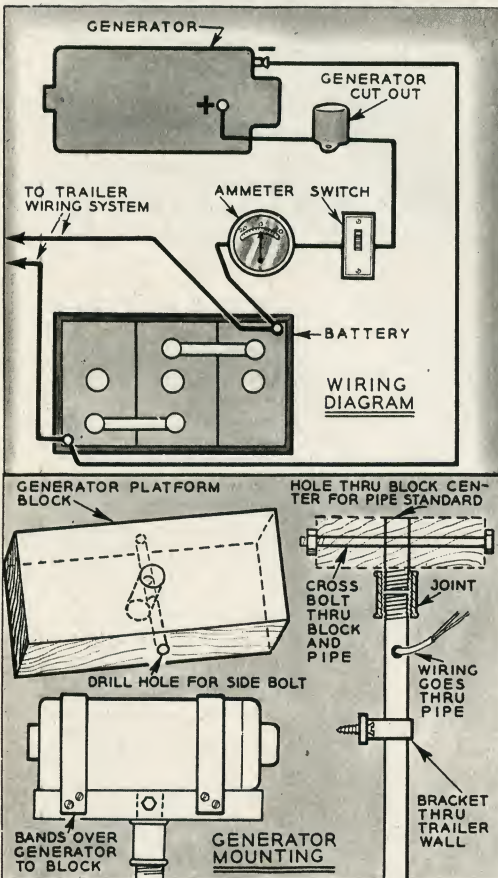
No longer need the car battery be made to suffer excessive drain for your trailer's requirements. This wind plant supplies current for operating all accessories.

SINCE few car's batteries can stand the excessive current drain demanded by the trailer's accessories it is necessary that an additional current source be provided to supply this extra current. Although many tourists camps offer connections to city current lines it is often necessary to camp in remote places where such camps are miles away. For the tourist who plans to travel in remote sections this wind generator system will prove its worth in a short time.

The generator is salvaged from a wrecked or junked car; any type of six-volt unit is satisfactory so long as it is in working condition. A length of two-inch iron pipe is flanged at both ends. The exact length of the pipe being determined by the height of the trailer. Mount a platform block for the generator to one of the pipe flanges and on this install the generator using iron straps to hold it in position. The pipe is, of course, fastened to the trailer frame and front trailer wall with machine bolts to make it thoroughly rigid.

Wires from the generator are brought down through the inside of the pipe and then into the trailer through an insulator. The cut-out which was originally located on the side of the generator is removed and mounted inside the trailer in the vicinity of the trailer's battery.

An ammeter, also salvaged from a demolished car is also used in the lighting circuit to determine the charge entering the battery. When little current is being con-



This wind driven generator will supply the trailer's six volt battery with sufficient current for operating lights, radio and the new six volt trailer appliances. Mount the generator, which can be salvaged from an old car, in manner shown in lower plans. Center diagram shows the manner in which it is wired.

FOR TRAILER LIGHTING



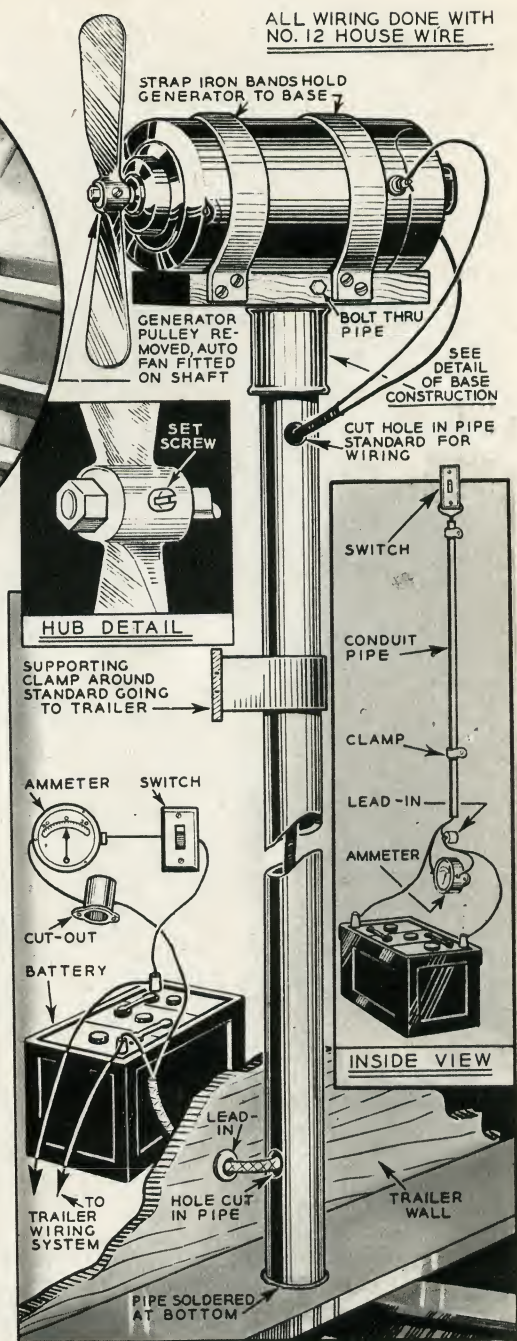
sumed by trailer appliances the generator switch should be opened so that the battery receives no charge. Excessive charging would otherwise ruin the battery.

Connect the trailer lighting system to the battery located in the trailer storage compartment. The trailer should be wired only with No. 12 house wire so as to minimize resistance losses. A small fuse block containing several automobile fuses will protect the system against short circuits. Mount the block in a convenient place so that it can be reached without difficulty.

Regular home lighting outlets can be installed in the trailer for operating the radio, table lamps and other electrical appliances. Standard size electric bulbs with six-volt filaments provide lighting which is on a par with the usual city current facilities.

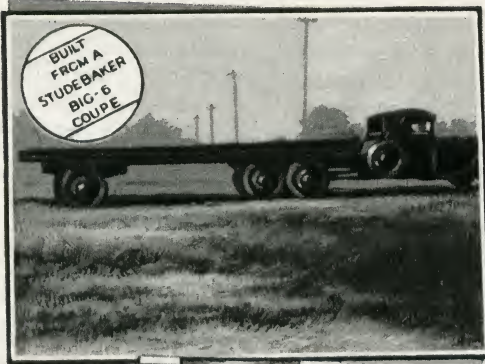
Anyone handy with tools can easily convert appliances of the 110-volt type into ones which will work on a storage battery. Of course, the original motor must be removed and a substitute used. Automobile horn motors from the larger make of car offers a satisfactory conversion for use in trailer food mixers, fans and hair driers.

The uses to which the wind charger plant can be placed are unlimited. The plant has no upkeep costs and requires only the slight attention of adding water to the battery cells occasionally.



Mounted on a length of pipe at the front of the trailer this converted automobile generator supplies sufficient current for all trailer needs. An auto radiator fan propeller drives generator. Connect battery plant to trailer's lighting system.

HOW TO BUILD YOUR

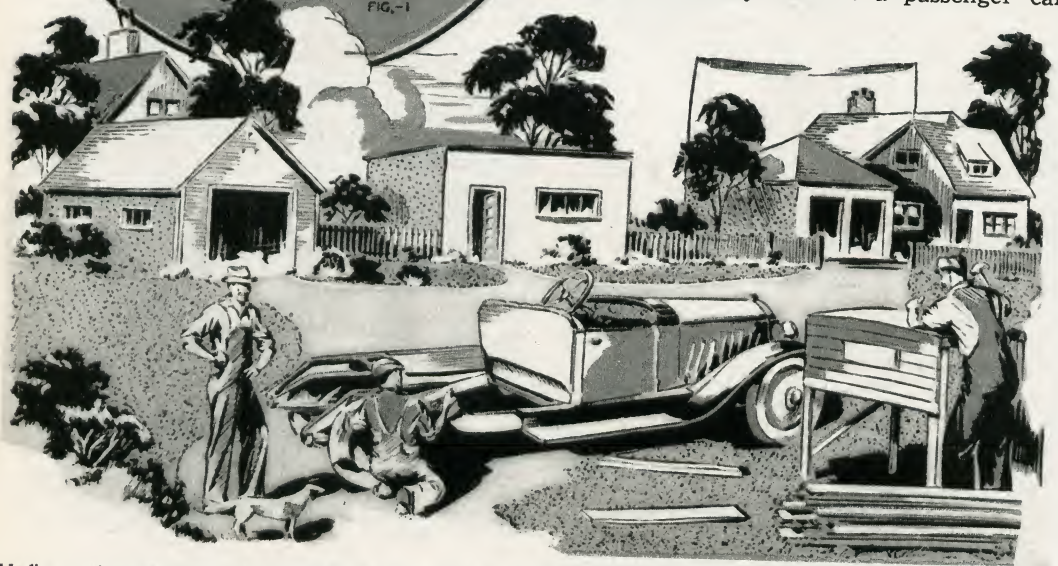
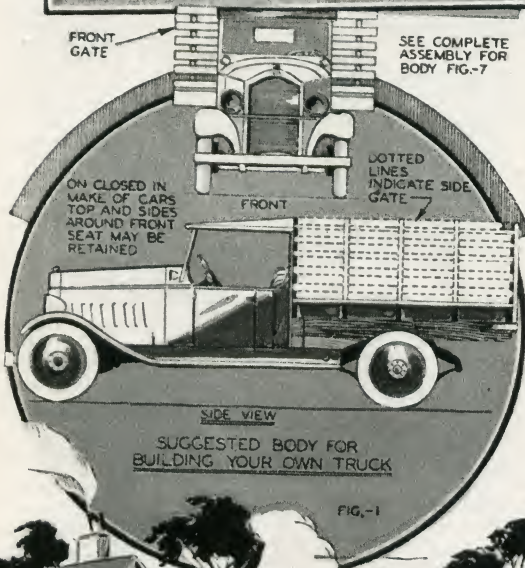


Economics which were discovered during the depression were responsible for many worthwhile ideas. This article describes how old passenger cars can be made into serviceable delivery trucks.

MANY people have found escape from the depression in building small trucks from passenger automobiles and using them in selling various kinds of merchandise, ranging from ice to honey. Others are using their "home-made" trucks for small hauling jobs. Only the other day I stopped to look over a converted truck parked along the road, and the owner thereof, who seemed a reasonably truthful man, told me he had earned \$75 during the past two weeks from various hauling jobs.

Some of these home-built trucks are very serviceable creations, while others reflect, in their clumsy design, the constructor's limited knowledge of the problems involved in converting a passenger car into a truck.

By applying the instructions and rules given in the following pages anyone of average mechanical ability should be able to successfully convert a passenger car



Medium weight cars like the Studebaker shown above and Willys, Chryslers and others can be used to haul one ton loads if the precautions for converting into trucks are heeded. The center diagram shows a suggested truck plan.

OWN TRUCK

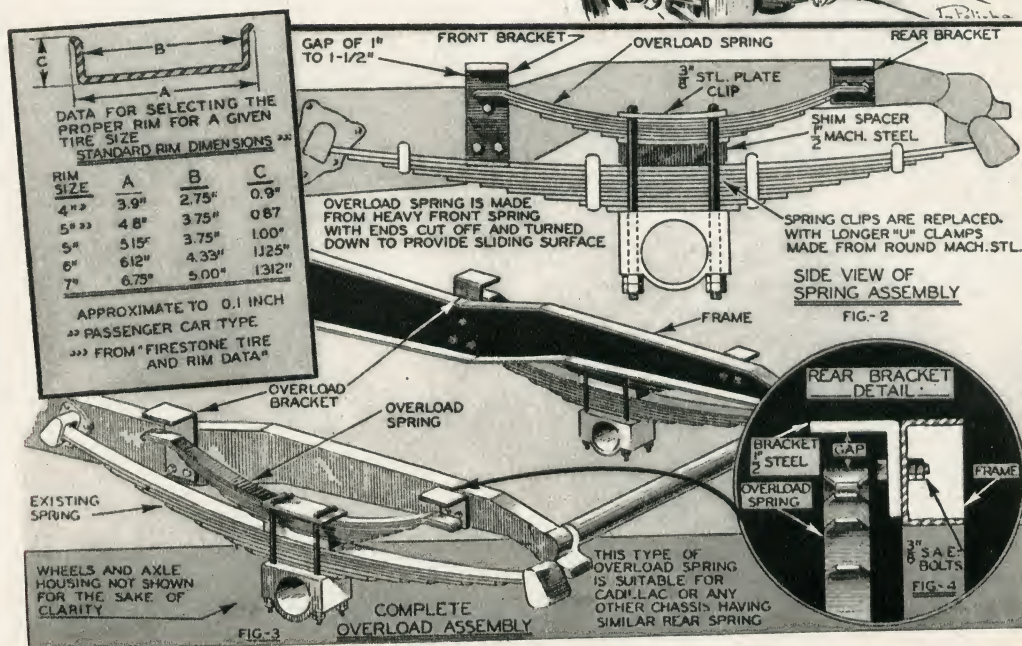
by JAMES G. THOMPSON

into a very serviceable truck capable of carrying 1 to 1¼ tons; at very moderate cost, and using the original chassis. Inasmuch as many dimensions, body details, etc., will be largely governed by the make of automobile used and the constructor's individual preference, the following article must of necessity be general in nature.

The principal problems involved in conversion are (1) providing overload springs to carry the added weight, (2) designing and building a body or bed on the chassis and (3) fitting larger tires to support the increased weight.

Light cars, such as Ford or Chevrolet, are suitable for conversion into delivery and "pick-up" jobs of about 1,000 pounds carrying capacity. The light chassis of these small cars does not permit carrying larger loads.

Medium and heavyweight cars, such as Studebaker, Willys-Knight, Cadillac, etc., are sturdy enough to carry substantial payloads. Obviously, the larger the car, the greater the load that can be carried after conversion into a truck. However, payloads greater than 1½ tons should not be consistently carried on any truck built upon a passenger car chassis, if normal



The first object to consider after selecting a good chassis are the springs. These should be the overload type instead of regular springs with extra leaves. The above diagrams show a suggested spring arrangement for truck conversion.

SEDANS BEST SUITED FOR TRUCK CONVERSION

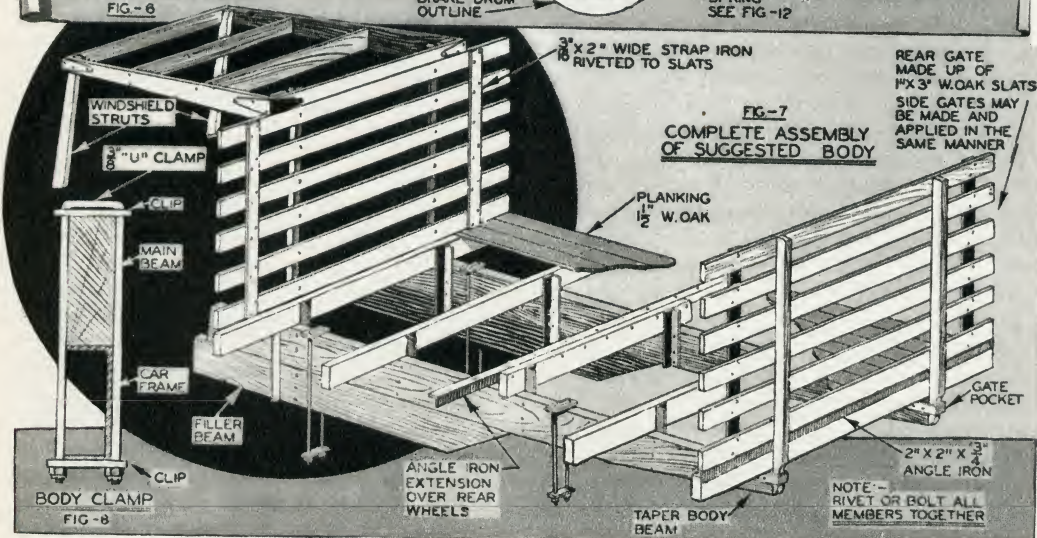
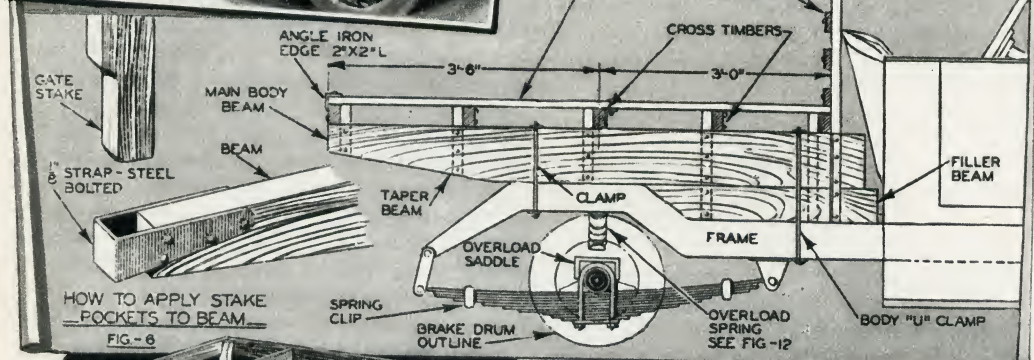
economy and freedom from mechanical troubles are expected.

When selecting an automobile for truck conversion measure the distance from the back of the front seat to the centerline of the rear axle. The greater this distance the longer the truck bed that can be built upon the chassis. If possible secure a car with full-

floating rear axles. Sedans and phaetons are best for conversion owing to the greater ease of removing the rear portion of the body by simply severing it in line with the forward edge of the rear doors.

After removing the aft section of the body inspect and overhaul the engine and driving mechanism while all parts are accessible. The entire machine will be called upon to give its utmost in truck service—give it a thorough checking over. It is much easier repaired now than in the middle of the night, fifty miles from "nowhere."

When overhauling the engine increase the valve tappet clearance about 50% to compensate for increased engine heat when pull-



The picture at upper right shows a Cadillac converted for light delivery use. Middle diagram shows a suggested body stringer arrangement. The truck stake panels can be constructed by following the assembly diagrams appearing above.

SPRING ARRANGEMENT PROVIDES SMOOTH RIDING

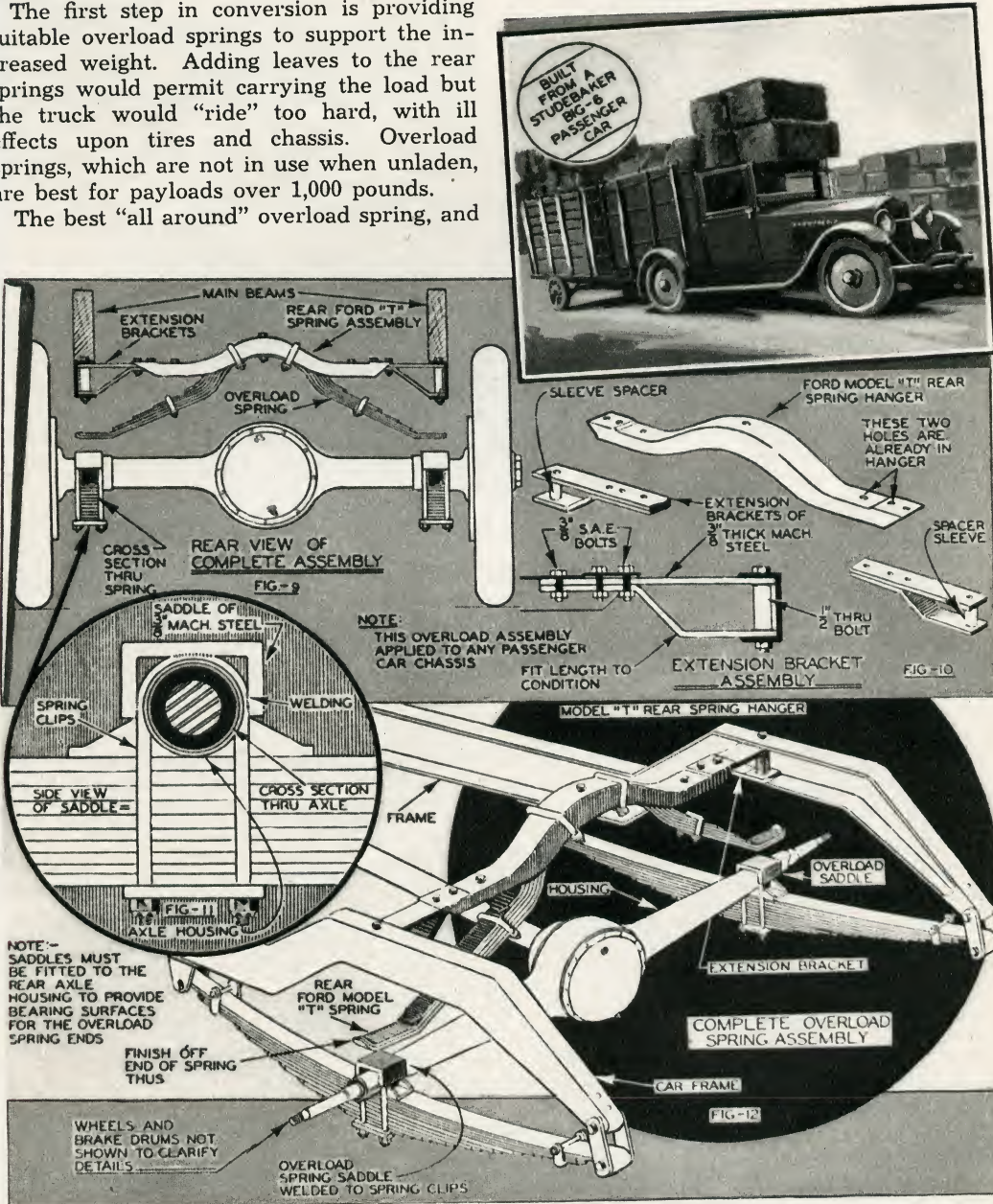
ing heavy loads. Unless this caution is heeded burnt valves are sure to result.

Thoroughly recondition the brake system. The brakes will be called upon to hold twice as much as before; don't take chances with them. The hand brake should not be neglected; it also should be adjusted, and re-lined if necessary.

The first step in conversion is providing suitable overload springs to support the increased weight. Adding leaves to the rear springs would permit carrying the load but the truck would "ride" too hard, with ill effects upon tires and chassis. Overload springs, which are not in use when unladen, are best for payloads over 1,000 pounds.

The best "all around" overload spring, and

one that can be used with nearly any kind of spring arrangement, consists of a Model T Ford rear spring and spring hanger attached to the frame directly over the rear axle housing and bearing on it when the truck is laden, supporting about half the payload weight. The overload spring ends bear on small steel



A suggested arrangement for brackets are outlined in the above illustrations. Overload springs installed over the rear-end of the truck permit the converted passenger car to carry heavy loads. Springs are salvaged from junked autos.

Spring Design Important For Heavy Loads

saddles welded to the rear axle housing, or to the rear spring clips.

The Ford rear frame member will be too short to reach across the frame of the average passenger car and brackets must be bolted to each side-rail to support the overload spring hanger. These brackets each consist of two lengths of $\frac{1}{2} \times 2$ in. machine steel bent to shape and drilled for attachment bolts. As can be seen from the accompanying illustrations, one length of steel is bolted to the top side-rail flange and the second strip to the lower flange. Both pieces are bent to meet at the end of the overload spring hanger and slip inside.

The outer end of the extension bracket is bolted to the side-rail with one $\frac{1}{2}$ -inch SAE machine bolt running through a spacer sleeve. This spacer consists of a length of $\frac{1}{2}$ -inch pipe cut just a trifle long and filed on the ends until it is a light drive-fit into place, preventing distortion of the side-rail upon tightening the thru-bolt.

In most installation the upper bracket strip will be straight and the lower strip bent up to meet it, as shown at Figure 2.

Steel saddles made from $\frac{1}{2}$ -inch machine steel bent to fit are welded to the top of the rear spring clips. These saddles, two in number, form bearing surfaces for the overload spring ends, and should be as wide as the distance between the outside edges of the spring clips to which they are welded.

The overload spring should be placed so that its ends are 1 to $1\frac{1}{2}$ inches above the bearing plates when the truck is unladen.

Weld the extension brackets to the frame side-rails after the installation is correct. This prevents "working" of the parts and possible failure. Do not weld the hanger to the brackets or it will be almost impossible to remove the spring in case of breakage. Electric welding is best for this work.

Sufficiently long leaves should be added to the rear springs to enable them to support 900 to 1,000 pounds payload before the overload spring comes into action. Two extra leaves in each rear spring are ordinarily sufficient; one each second and third leaves. Deeper spring leaf-clips will be necessary after adding leaves. The spring clips proper are usually long enough to permit adding the extra; if not, longer spring clips can easily be made from round machine steel of the proper size. Retighten the spring clip nuts after driving a few miles to "set" the springs.

The next step in the conversion is providing a suitable body to carry the payload. A simple platform style of body is best for most purposes; but the choice of body will depend entirely upon the preference of individual construction. Construction data for a platform body $6\frac{1}{2}$ feet long and 6 feet wide is given in accompanying illustrations. For bodies of other dimensions the measurements will have to be altered proportionately.

This body consists primarily of two filler beams, two main beams, a sufficient number of cross timbers and 1x6-inch floor planking. A head-gate is made from 1x3-inch timbers bolted to angle iron uprights.

The filler beams are tapered wooden beams, one on each side, cut to fit between the back of the front seat and the rear frame arches. These beams rest on top of the frame side-rails and are 2 inches wide and high enough to provide a level foundation for the main beams.

After being cut to size the filler and main beams for each side should be bolted together with length of 1-inch angle iron at the cross timber stations, as shown, and clamped in place to the side-rails with long U-bolts.

These same lengths of angle iron also secure the 2x4-inch cross timbers and should be located to place the cross timbers in the correct position. In no case should the cross timbers be more than 24 inches apart.

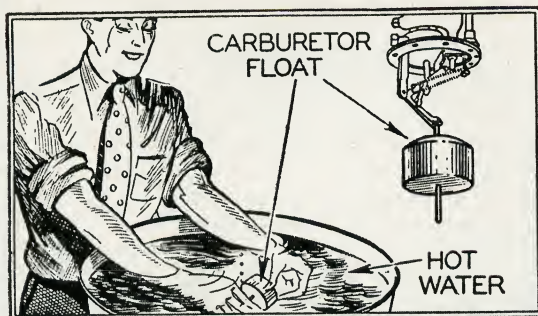
The front cross timber should be located 1 inch aft of the rearmost part of the front seat to allow space for the head-gate.

It should be noted that the cross timber over the rear axle is cut short and fitted with an angle iron extension to avoid interference with the rear tires.

All floor planking is 1x6-inch timbers nailed and bolted in place. A length of $2 \times \frac{3}{16}$ -inch angle iron is bolted to the rear edge of the floor planking to prevent splitting.

When building the body, two items are of paramount importance. First, sufficient clearance must be allowed between the top of the rear tires and the nearest portion of the body to prevent fouling the tires when laden. If tires of the same or small overall diameter will be used on the rear wheels allow the same clearance distance originally between tire and fender. If tires of greater overall diameter are used the wheel clearance must be increased accordingly.

USEFUL HINTS FOR TOURISTS



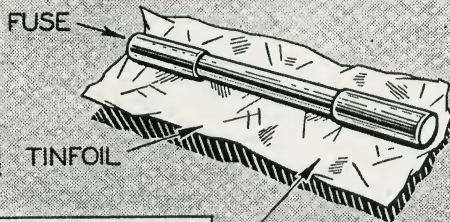
CARBURETOR FLOAT LEAKS

can easily be located by removing float and placing in dish of hot water. Note where bubbles appear, remove float immediately, and seal up holes with solder. If considerable water or gasoline has entered, dry out float in oven to drive out moisture before soldering.

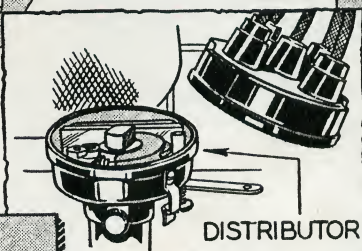


CORROSION can easily be removed from storage battery terminals with rag dipped in solution of baking soda and water. When cleaned, a coating of vaseline will prevent further corrosion.

FUSE which is burned out may be temporarily used by joining end contacts with fine tinfoil as at right.

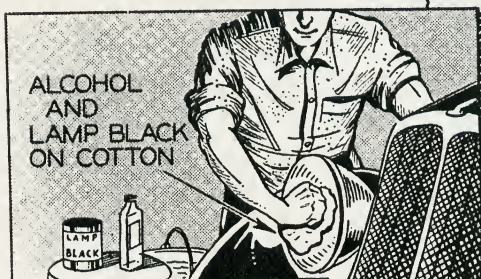


BURNED-OUT FUSE WRAPPED WITH TINFOIL



LOCK CAR

by removing rotor from distributor. Rather than lift up hood to locate trouble, auto thieves will move on to other cars. No one can start car until distributor is replaced.

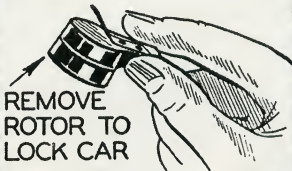


REFLECTORS of auto headlights can be polished quickly without scratching by rubbing with lamp black and alcohol on wad of cotton.

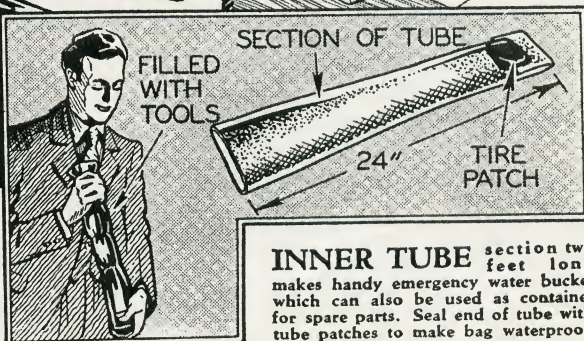


FLOOR BOARD SQUEAKS

can be very annoying in any car. Lift up boards one at a time and paint ends with graphite grease. Paint side edges of boards and all parts of car in contact with the loose boards if squeaks persist. Graphite in grease will lubricate boards long after grease itself has penetrated into wood.



LEAKS in gas tank are permanently repaired by first thoroughly drying out tank, then pouring in shellac. Swish shellac around into all corners, then drain and let dry.



INNER TUBE section two feet long makes handy emergency water bucket which can also be used as container for spare parts. Seal end of tube with tube patches to make bag waterproof.

YOU CAN BUILD THIS SIX-



Designed for use in either car or trailer this efficient six tube receiver provides excellent volume even on distant stations. By following picture diagrams even those without radio experience can construct it.

sary by-pass condensers and resistors left out. Why complicate a circuit with things that do little or no good?

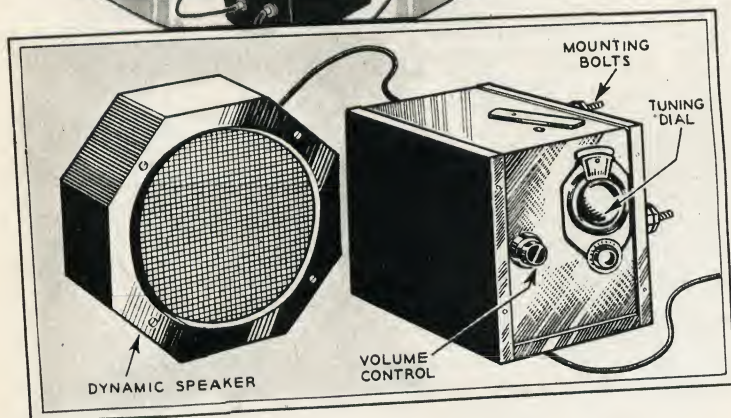
This radio employs six inexpensive automotive tubes. These include two -78 R. F. amplifiers, a -77 as a grid bias detector, a -37 as audio amplifier and two -38 power amplifiers in push-pull. This arrangement gives plenty of volume for auto and even more when used as a farm set with an antenna.

Most of the materials required for constructing this receiver can be purchased from any mail order radio supply house. The chassis and shield can be constructed by the builder or by a tinsmith. In some cases it may be possible to secure a finished chassis from the radio supply house.

In purchasing the necessary coils be certain that they match the tuning condensers. If you are very ambitious you can wind your own coils, but it is suggested that

you buy them ready made since the set of three matched coils in aluminum shield cans costs less than \$1.50.

For those wishing to make their own the following is given: Secondary windings of R. F. coils—127 turns of No. 36 enameled copper wire wound on a bakelite or even cardboard form (mailing tube) 1" in diameter. The primary coil is wound over the secondary winding, separated by insulating cloth (commonly called "Empire" cloth) or "fish" paper. In the case of the antenna coil the primary winding is a manufactured type

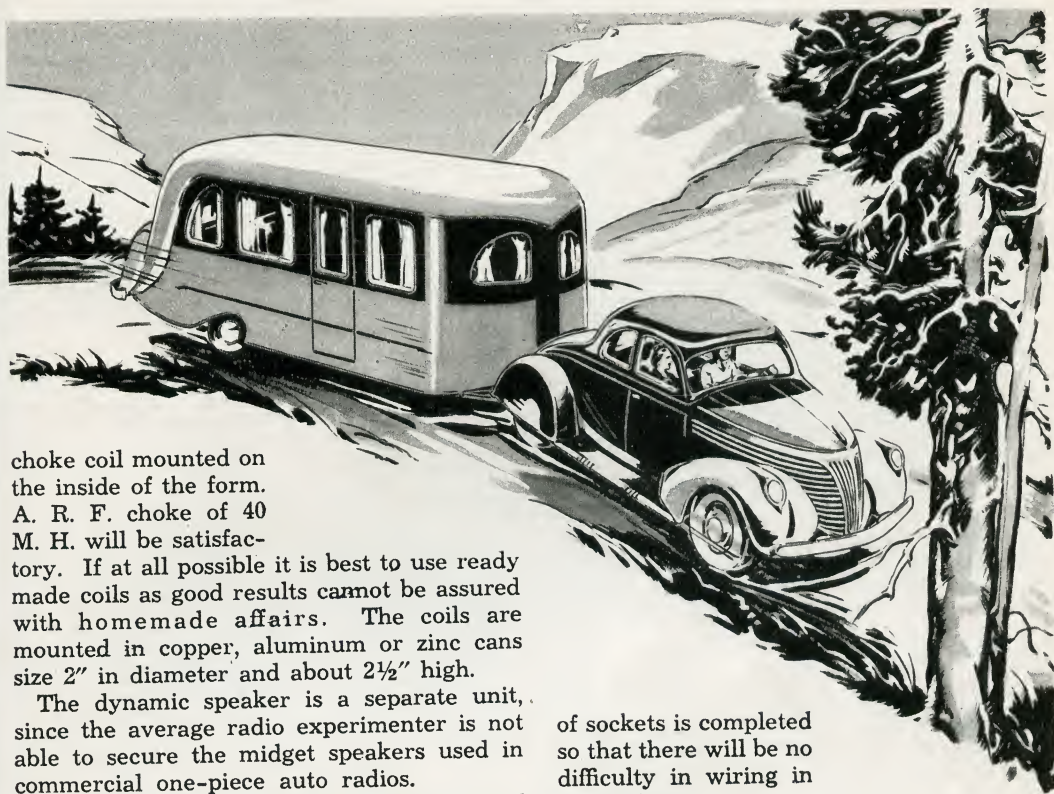


Here is the ideal trailer receiver for you to build. The set employs simple, but highly efficient circuit that guarantees good reception no matter if you are miles from a radio broadcasting station. The set features a dynamic type speaker with extension cord so that it can be moved outdoors for dancing. Bolts on the metal cabinet permit it to be mounted to the side of a storage cabinet.

WHEN building trailer receivers several very important factors must be considered or else the receiver will be too large, not sensitive or too costly to construct. To be certain that none of these difficulties will arise, a receiver has been designed that is very sensitive, tiny, simple to construct and, most important, very inexpensive.

The average person does not want to work with complicated circuits which are even too difficult for an experienced radio engineer. In this receiver the circuit has been made just as clean-cut as possible with all unneces-

TUBE AUTO TRAILER RADIO



choke coil mounted on the inside of the form. A. R. F. choke of 40 M. H. will be satisfactory. If at all possible it is best to use ready made coils as good results cannot be assured with homemade affairs. The coils are mounted in copper, aluminum or zinc cans size 2" in diameter and about 2½" high.

The dynamic speaker is a separate unit, since the average radio experimenter is not able to secure the midget speakers used in commercial one-piece auto radios.

The power unit has also been left out of the chassis, permitting the builder to use either B batteries or a B power unit operating from the car or trailer battery, as he wishes.

The chassis is made according to the template shown. It is nothing more than a sheet of heavy galvanized iron or, better, No. 16-gauge aluminum 9"x11", with two end sections 6"x2½" for the ends. The necessary socket holes are cut out with a hole cutter, and the chassis then cut out, bent to shape, and riveted together.

The chassis completed, construction on the actual set can be started. By taking it easy and following the pictorial diagram there will be no difficulties. First, mount the sockets. These are the wafer type which take up very little space and are bolted to the chassis top.

Next, install the three coils, being careful to mount the antenna coil in the corner. The coils are mounted directly underneath the space that will be occupied by the three gang tuning condenser. The only other item that is mounted underneath the chassis is the push-pull transformer. It is suggested that this transformer be left out until all wiring

of sockets is completed so that there will be no difficulty in wiring in the sockets.

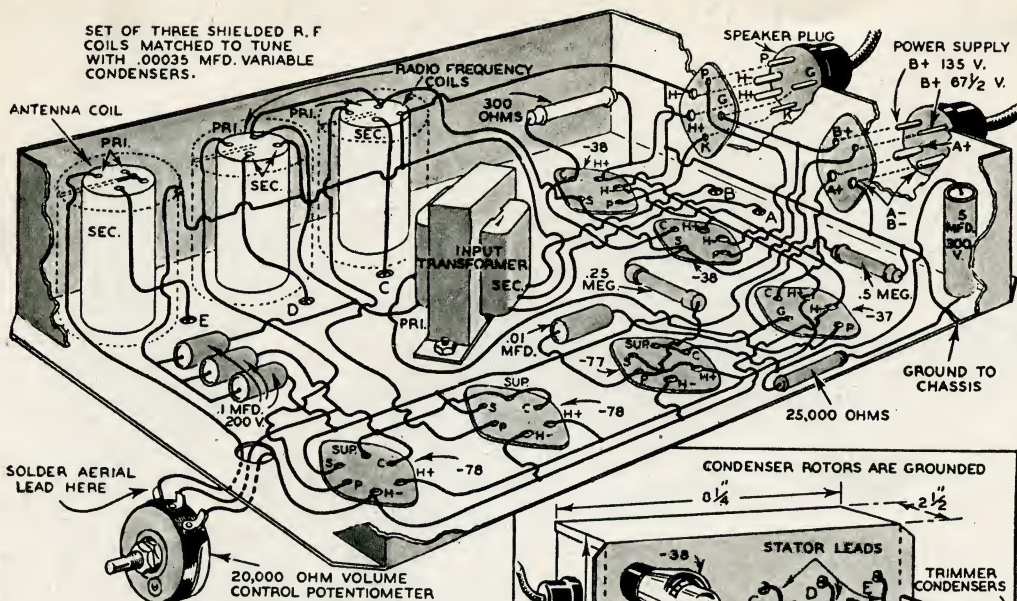
The tube shields and condensers are left off the top of the chassis until all wiring has been completed. It is much easier to wire up the set in this manner, as the chassis may be laid on the workbench bottom up and soldering in of resistors and condensers done with ease.

For ease in construction it is suggested that the fixed condensers as well as resistors be of the "pig tail" type, eliminating unnecessary wiring.

The antenna lead is connected to one side of the potentiometer arm or directly to the top of the antenna coil primary. No terminal is used here—just a soldered lead.

The two sockets on the side of the receiver chassis serve as terminals for the necessary speaker and power supply connections. Of course these schemes can be ignored and cables run directly from set to power source. The plug and socket method of making connections permits the chassis to be removed from the case at any time, without disconnecting any wires.

Now that all under wiring is completed the



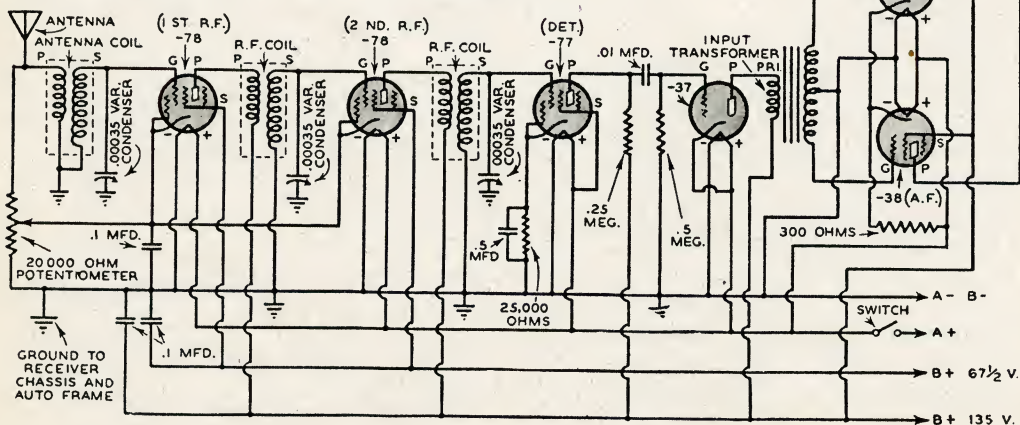
final work on the top of the receiver may be tackled. As the rotors of all three condenser sections are grounded to the chassis, connections are only made to the fixed plates.

The three condenser gang is accurately matched at the factory, but the slightest bump or jar may destroy this balance. If a gang condenser having trimmer condensers mounted integral is used, as shown in the sketches and photographs, the tuning condensers can be rematched after the set is assembled. Adjust each with a screwdriver after the set is working until reception is loudest and clearest.

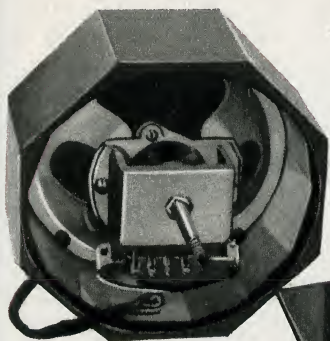
Short leads are run from the trimmer condensers to their respective tube grids. Remember that in wiring in screen grid tubes the grid lead goes to the cap on top of the tube, and the screen grid lead to the grid prong of the socket.

It is very important that the radio frequency

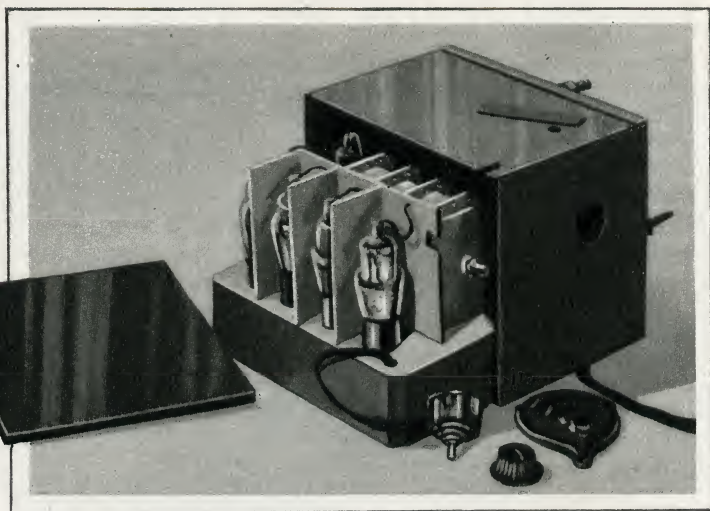
Anyone without previous radio experience can successfully build this trailer-receiver. The parts, available from any radio supply house are wired up according to above pictorial plan. Schematic circuit appears below.



INEXPENSIVE BATTERIES PROVIDE BETTER OPERATION



The completed receiver is fitted into a metal cabinet similar to the one shown at right. A manufactured type cabinet can be used if desired. Dynamic speaker and B batteries cable plug into set chassis for quick power connection.



and detector tubes be shielded from each other. To do this a very simple shield arrangement is used. Strips of metal slightly higher than the tubes are riveted or bolted together to house each tube in what might be called its own "stall."

The power required for this receiver is but 135 volts. If the usual 45-volt B cells are used the 67½-volt screen grid supply is taken off from the 22½-volt clip on the second B battery in the circuit. A total of three 45-volt B batteries connected in series gives the required 135 volts.

If an auto B power unit is used a center-tapped voltage divider will provide the correct screen grid voltage. Use shielded cable for all battery leads. The speaker used is an automotive type dynamic requiring only six volts on the field coil. Connect the speaker leads to the speaker plug as shown in the pictorial diagram.

After the receiver is completed a can for containing it must be constructed or purchased. The size of this container is 9"x-7½"x6¼". The front of the can opens to allow removal of the set. Two small angle strips are bolted to the container just high enough to allow the chassis to slide in.

The can should be mounted in a convenient location inside the trailer. Two holes in the back of the can are drilled for this purpose. It is only necessary to drill two holes in the wood or steel bulkhead, and bolt the can in place. In this location it is very simple to get the necessary current. The chassis being automatically grounded it is only necessary

to connect on to the "hot" side of the trailer battery to get the current for the tube filaments, dynamic speaker field and auto B Power Unit if one is used.

The last item to be dealt with is the tuning control. Here there is a choice of one of two methods. The usual scheme is a remote control device mounted on the steering post of the auto. The remote control equipment is expensive, however, and will in no way improve the operation of the set. A simpler method, now being adopted on many new makes of auto radios, will be followed.

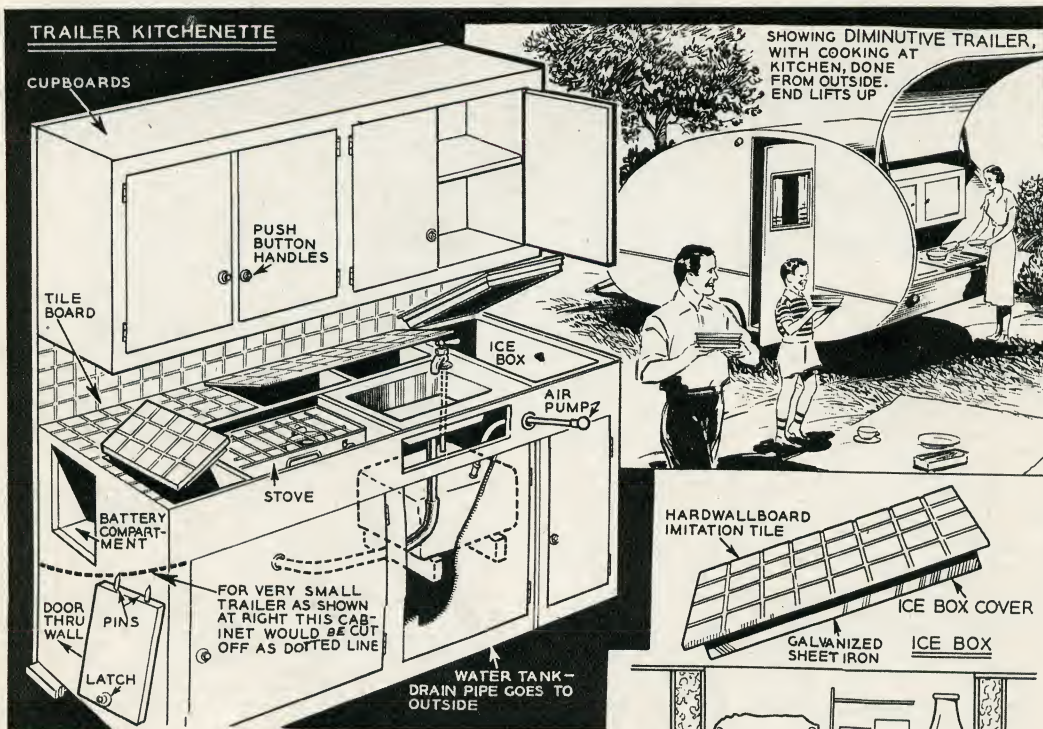
Direct tuning with a regular dial mounted on the side of the can is used. Tuning will be easier if the set is clamped to the side of the steering post instead of under the dash. A combination volume control and switch is mounted next to the tuning dial.

The antenna may be a length of copper fly screen mounted under the roof of the trailer or underneath the body, whichever is the most convenient.

Since the speaker is separate from the set it can be moved outdoors when music is desired for dancing. Mounted to the side of a storage cabinet the set remains out of the way at all times.

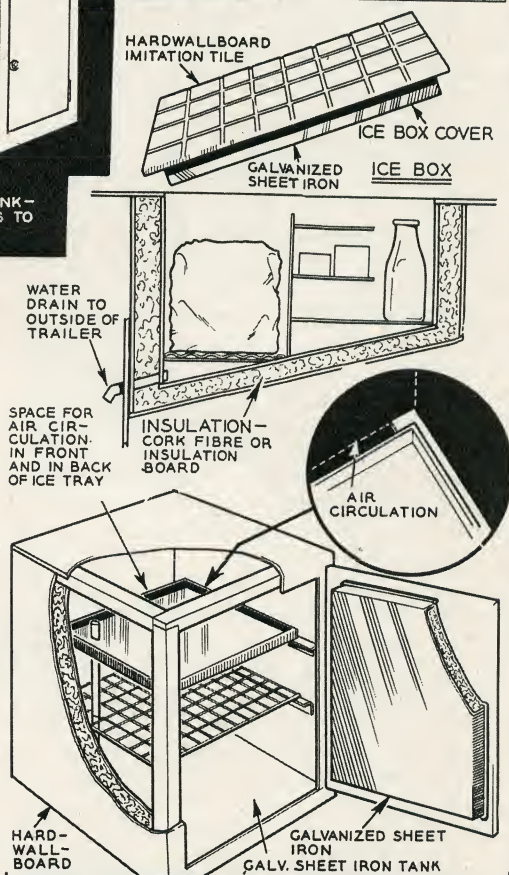
BLUE LINE PRINTS for this auto radio are available at 50c postpaid. These prints will be of great help in building the set, for all diagrams are enlarged many times. A complete list of the parts needed, and instructions for making your own B power supply have been added on the blueprint. Send your order to Blueprint Dept., Modern Mechanix Publishing Co., Fawcett Bldg., Greenwich, Conn.

BUILT-IN FEATURES



Every trailer requires some means for storing foods and cooking utensils. The above arrangement, while merely suggestive, shows how a compact kitchen cabinet and sink can be built so as to be practical even when used in miniature cabin trailers. Tile boards hide the kerosene range and sink when not in use.

SO MANY excellent materials, especially well adapted to trailer use, are now available that the construction of built-in equipment is not only greatly simplified but the completed job is definitely better than with materials in favor a few years ago. We refer principally to the thin, hard wallboards which meet high standards of density, strength and durability. These can be had in the tempered quality, and will withstand excessive moisture and unusual wear, and panels only $\frac{1}{8}$ in. thick are available in four-foot widths up to twelve feet long. This type of board is very popular in trailer construction, as is also plywood in various thicknesses. Either is unequalled for interior fittings or built-in compartments, etc. In combination with casein waterproof glue and occasionally small flat-head brass screws, countersunk, a very strong structure is achieved with very little weight. And the



A refrigerator is a necessity and should be incorporated into the design of your trailer if not already allowed for. Hard wallboard and galvanized metal were used in constructing this compact ice box. It is so designed that melted ice is drained.

FOR THE TRAILER



Above photo shows a clever kitchen arrangement which can be applied to most trailer designs. Water is pumped to sink by a small double action pump. Storage cabinets are under sink.

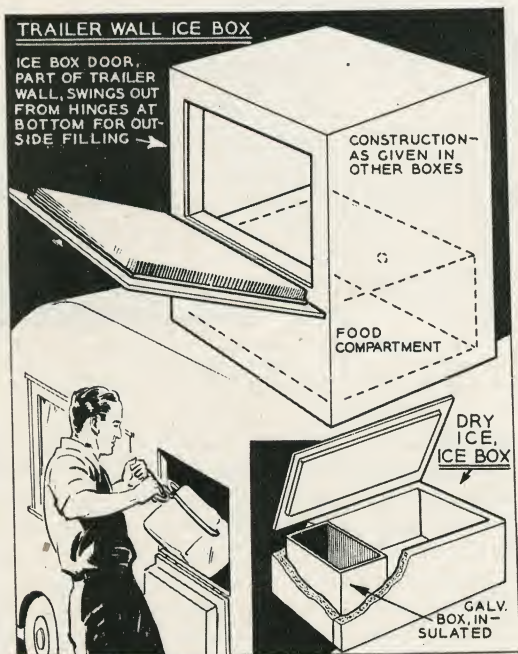


thinness of the wallboard or plywood requires a minimum of space for itself. Being in one-piece panels, this material has proved in tests to be superior to horizontal or vertical sheathing made up of a number of separate boards. No diagonal bracing is necessary with the wallboard or plywood.

A convenient kitchenette installation for the compact, two-tenant trailer having the cooking equipment under a hinged cover at the rear. This exceptionally well-designed and carefully built trailer was created and built by Charles W. Brentner, of Pasadena, and illustrates how good a job an amateur can accomplish.

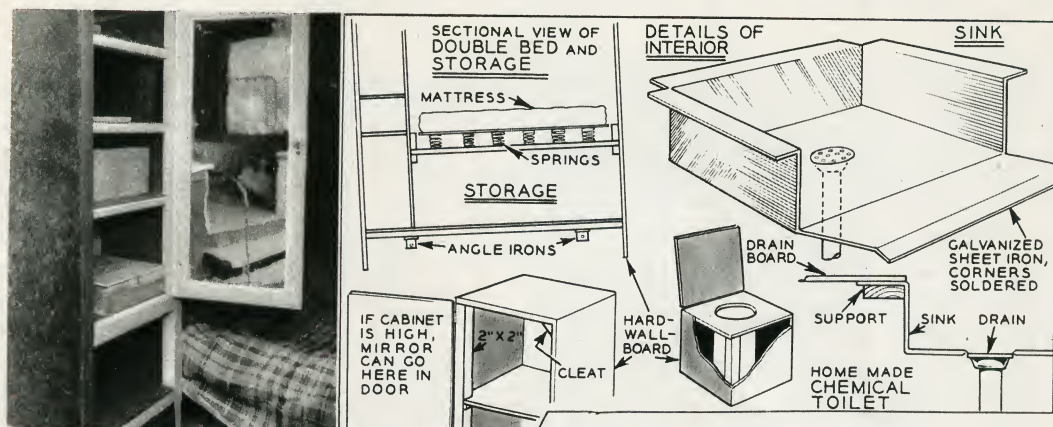
In the limited space of the rear compartment is an ice box, stove, sink, water tap and tank, and several compartments for utensils. Above is a roomy cupboard capable of carrying dishes and non-perishable food for two weeks. The ice box, in addition to the ice, has an exceptionally large capacity and on two-weeks trip Mr. Brentner was obliged to replenish with ice only three times.

The air pressure water system permits the tank being placed low, thus holding down the center of gravity. Although a cylindrical tank is best for pressure uses, one of rectangular section takes up less room. The latter should be sturdily made, although a few pounds pressure will send the water up the



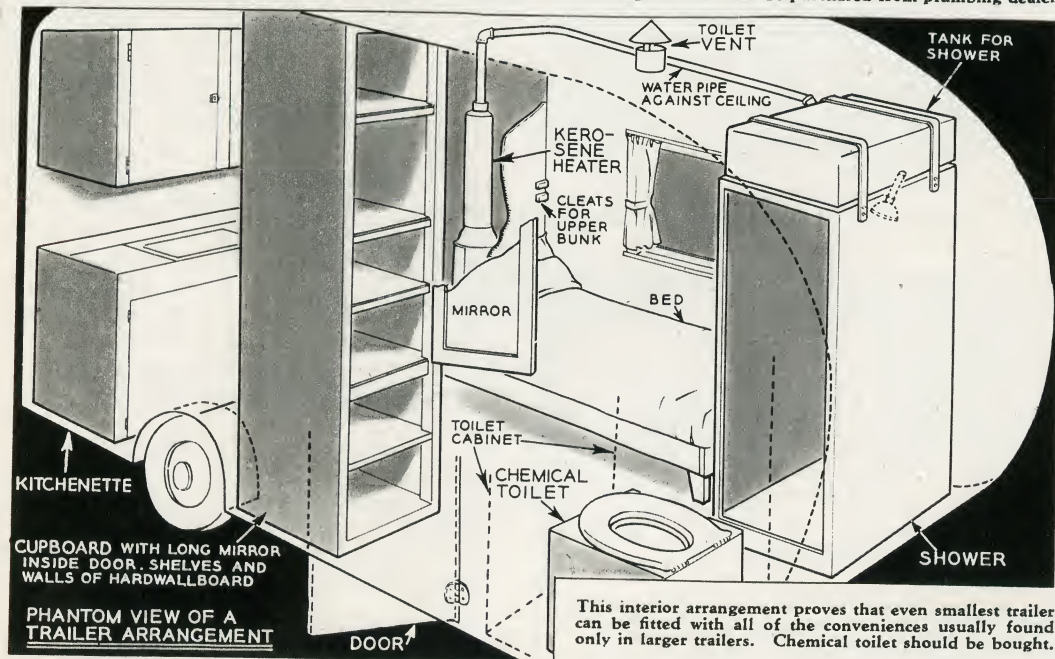
Where space does not permit ice to be inserted through refrigerator door, outside hatch can be built into trailer and ice deposited without muss. Above plan shows such arrangement.

Even Smallest Trailer Can Have Best Conveniences



Cabinets for clothing can be installed next to bunks. A mirror of more than ample size is located inside door. This position eliminates danger of breakage, as can be seen in above photo.

Above plans show manner in which sink is constructed from galvanized iron. All joints should be securely soldered to prevent leakage. A drain can be purchased from plumbing dealer.



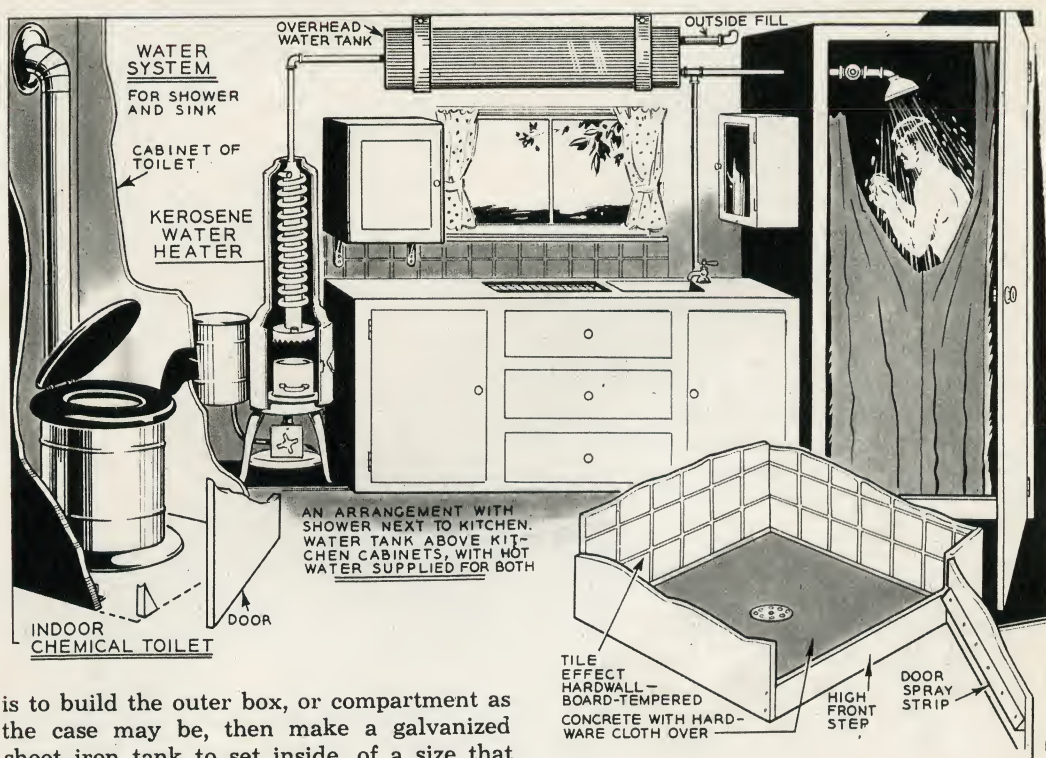
This interior arrangement proves that even smallest trailer can be fitted with all of the conveniences usually found only in larger trailers. Chemical toilet should be bought,

short distance to the sink tap. In Fig. 2 is shown the arrangement of the system on the Brentner trailer. The air pump is located under the sink, the plunger being out of the way when pushed down. It is connected to the tank by a copper tube, with an ordinary tire valve soldered into the tank. In this arrangement the filler cap should have a gasket so that air does not escape. A Ford Model T tank is satisfactory for this purpose if the water is not to be used for drinking. The vent in the filler cap should, of course, be

plugged up. Drinking water is best kept in a glass jug or carboy. For filling pails too large to get under the tap, a small drain cock can be soldered into the bottom.

Sectional and cutaway views of the ice box are shown in the accompanying diagrams. The bottom of this one slopes up to fit in the rounded end of the streamlined trailer. No dimensions are given on this and other equipment of trailers shown herein, as the individual will need to fit to his own specifications. A simple way to make an ice box

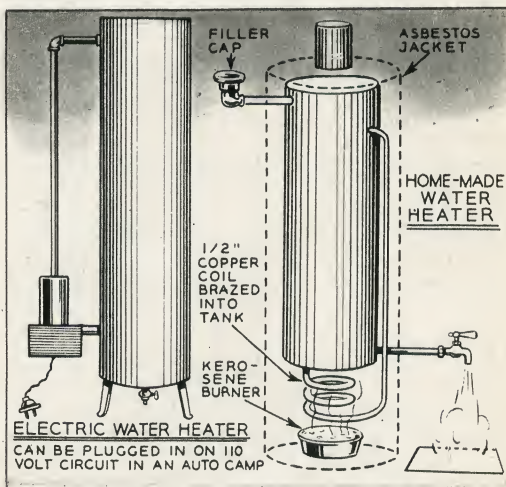
Several Water Systems Available For Trailer Use



is to build the outer box, or compartment as the case may be, then make a galvanized sheet-iron tank to set inside, of a size that will leave an inch or more space all around. This space is then filled with sheet or ground cork, or fibre insulating board (Celotex 1 in. thick is satisfactory). The lid has similar construction, built on a $\frac{3}{8}$ -in. plywood panel. On account of the sloping bottom of this ice box steps are necessary to keep contents level. A section of corrugated galvanized sheet-iron set on angle irons supports the ice. It should be removable. And of course, there should be a drain tube in the bottom.

In Fig. 4 the floor plan of the Brentner trailer shows the compact arrangement of built-in features, without restricting the size of the bed, which is a full 56 in. by 75 in. Underneath is ample storage space for extra sleeping bags for additional passengers in the towing car, camp chairs, suitcases, boxes of canned goods, fishing tackle, guns, ammunition, and even a folding canvas canoe could be stored under here. On the right side are shelves and a large compartment for bedding, clothes, etc. The door to the shelves has a long mirror on the inside. The toilet consists of simply a box in the corner, with folding lid, and chemical tank inside. It is inconspicuous and handy. Above the sleepers' heads is an-

The larger trailer can be fitted with all of the conveniences found in modern home including running hot and cold water. A kerosene water heater can be installed in the manner shown

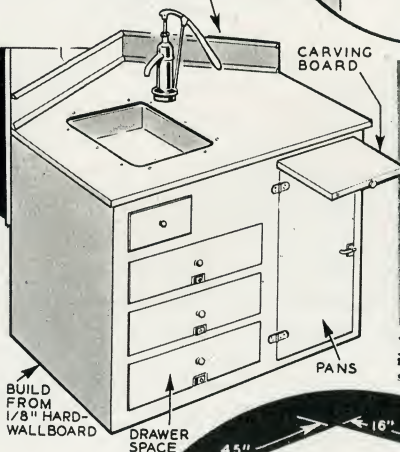
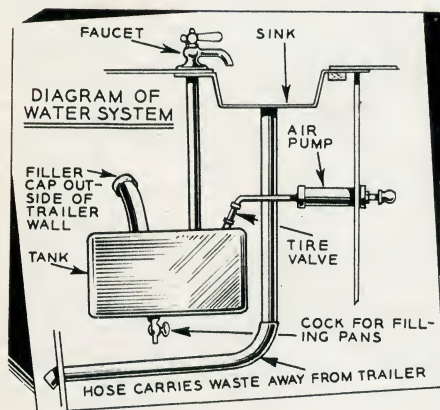
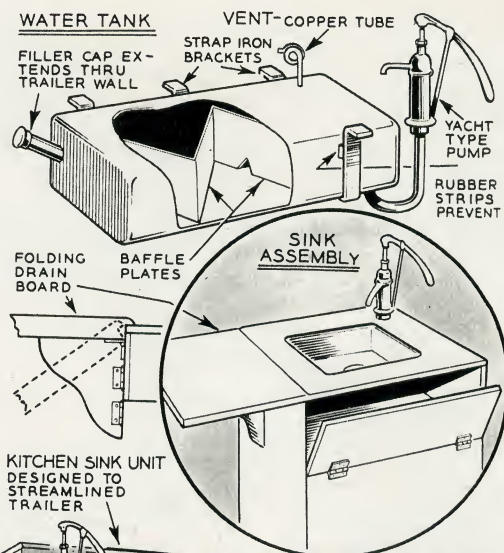


Two forms of home-built water heaters are shown here. The kerosene is most economical and can be used any time, anywhere. A kerosene lamp can be used to heat copper water coils.

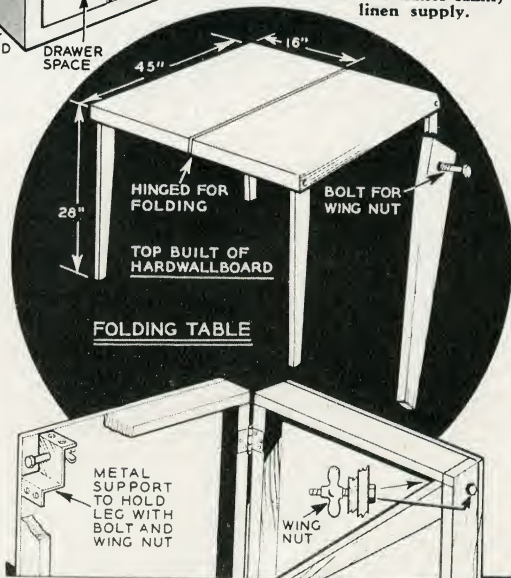
Novel Folding Table Stores Trailer's Linen Supply

other rack for clothes, as well as a similar one at the foot.

With the use of hard wallboard, cabinet making is a very simple matter. Three-cornered cleats are used under the wallboard shelves, secured with brads and casein waterproof glue, and elsewhere $\frac{3}{4}$ in. by $\frac{3}{4}$ in. cleats, such as in horizontal construction can be used. If there is occasion to attach hinges directly to the wallboard without any cleats or wood in back, use copper rivets. Doors can be stiffened by setting a truss or two of wood crosswise inside where they will not interfere with shelves, or by building a light frame, secured with brads and glue, around the edges. Push-button catches are much favored by experienced trailer builders, as these prevent the doors opening when in motion, and do not catch on the



This simply made folding table when folded stores the trailer family's linen supply.



Another suggested automatic water system is shown here. Instead of the usual gravity feed water is lead to faucet by force.

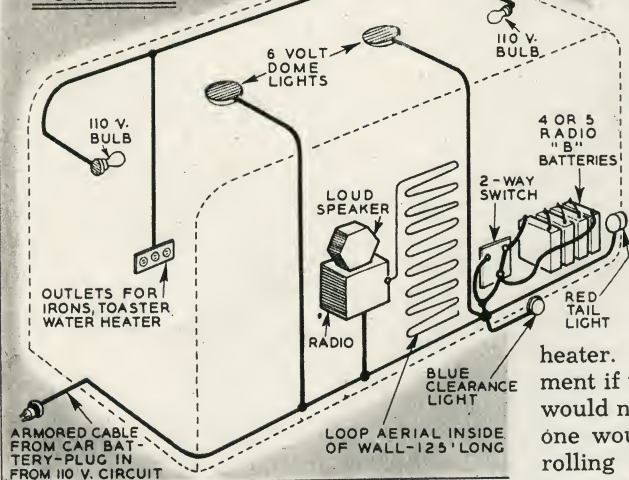
clothing when occupants move about inside.

A full headroom toilet is easily installed. The enclosure is built of wallboard or plywood—about $\frac{1}{4}$ in. thick—and is equipped with a standard chemical toilet with vent. These may be purchased at mail order houses for a nominal sum. Care should be taken in fitting doors to toilets neatly; in fact, this same thorough-going workmanship should apply to the entire job. If the chassis-bed is properly built, the doors and drawers will not bind, once well fitted.

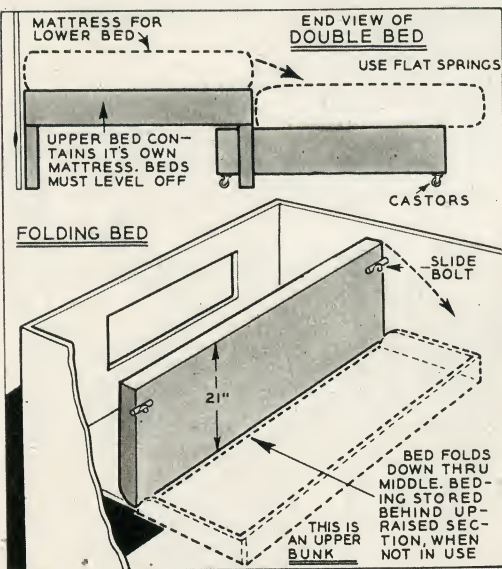
Shower baths are generally possible only in the larger trailers, especially if hot water equipment is to be used in connection. The illustrations show a complete system using a

Folding Trailer Beds Provide Extra Living Room

TYPICAL LIGHTING SYSTEM



One of most important problems to consider when building a trailer is the lighting system. Every trailer must be equipped with clearance lights. Wire trailer with No. 12 house wire and provide the necessary outlets for connecting trailer appliances.



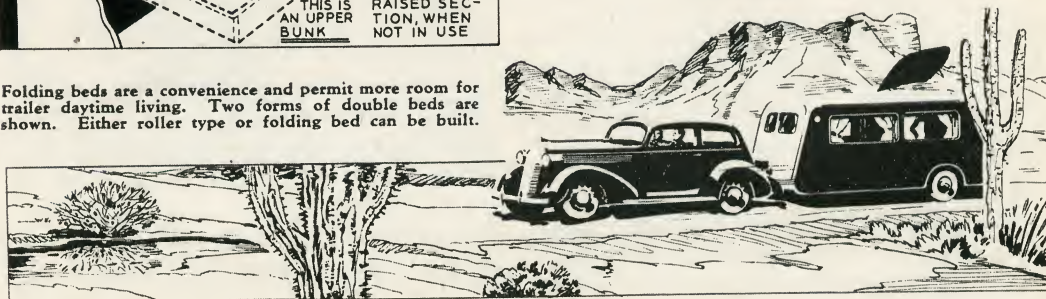
Folding beds are a convenience and permit more room for trailer daytime living. Two forms of double beds are shown. Either roller type or folding bed can be built.



Another excellent type of folding bed is pictured above. When not in use half of the bed folds away into a compact overhead cabinet. The lounge underneath it also serves as a bed.

kerosene water heater. This requires an overhead tank since to get circulation the storage tank must be located higher than the heater. This would be a top-heavy arrangement if water were carried en route, but that would not be at all necessary inasmuch as no one would be likely to indulge in a shower rolling along at fifty per. A tank for this purpose, to be out of the way as much as possible, should have a flat, oval section if inside the trailer, or made to conform to the contour of the ceiling, with the filler cap outside. In some trailers the shower and toilet are in the same compartment, with a waterproof cover over the latter when being used for bathing. Walls can be made of hard wall-board, the tempered variety, in tile pattern, and painted in delicate shades of green, blue or ivory, will resemble real tile very closely. The floor should be built up of waterproof cement, with hardware cloth reinforcement, and sloping all around toward the drain in the center. A strip $\frac{3}{4}$ in. by 3 in. high runs across the bottom of the door opening, and a three-cornered piece on the door extends over the former when the door is closed, thus deflecting the spray from going outside.

When parked in a modern auto camp, heating and cooking problems can be simplified greatly by plugging in to the 110-volt circuit.

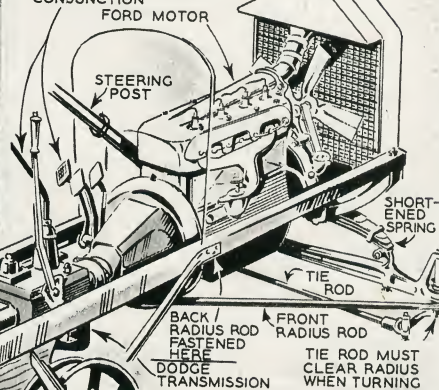


BUILD "HANDY HENRY"

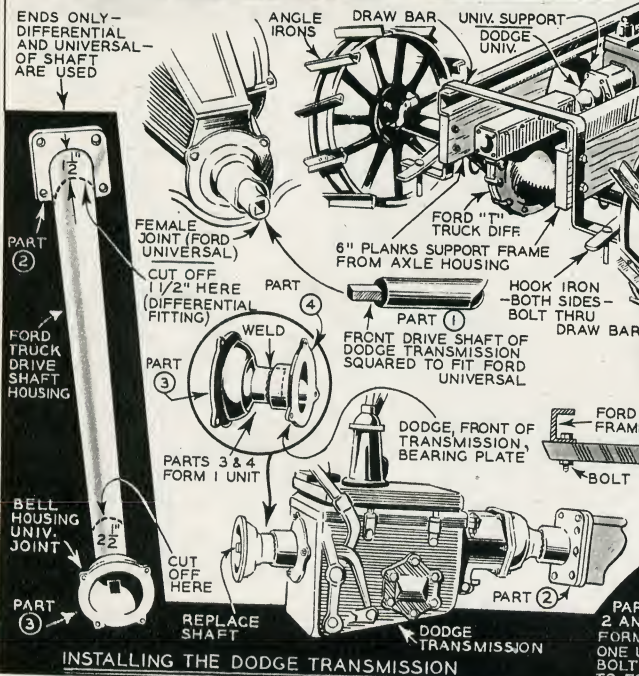


ASSEMBLY OF HANDY HENRY

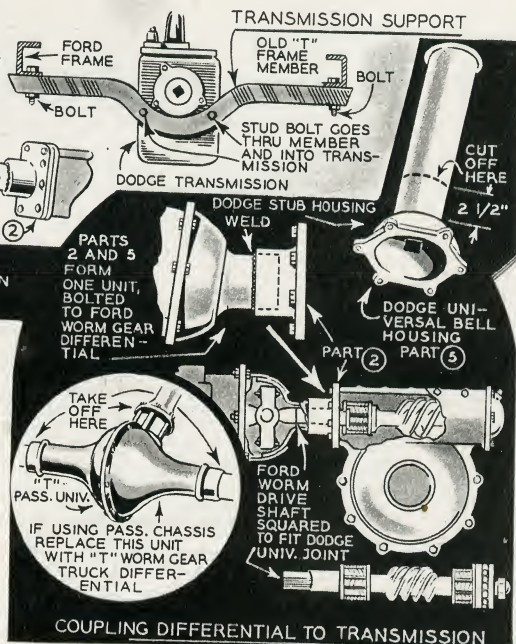
TRACTOR NOW HAS 6 FORWARD AND 2 REVERSE SPEEDS - FORD AND DODGE TRANSMISSIONS ARE USED IN CONJUNCTION



ENDS ONLY - DIFFERENTIAL AND UNIVERSAL - OF SHAFT ARE USED



The above pictorial layout shows the placement of all parts on the completed tractor. The tractor is shown at work, in the upper left hand picture, doing the work ordinarily done by a team of horses. Removable rims permit the tractor to operate on either pneumatic tires or flanged wheels.



To provide sufficient flexibility the chassis is cut down as shown. Cut out the original drive shaft housing and insert a Dodge transmission to provide the necessary gear ratios for pulling heavy loads. Transmission is welded to bell housings and supported by "T" frame member. Welds must be secure.

by E. H. GIBSON

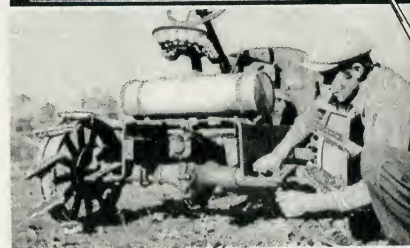
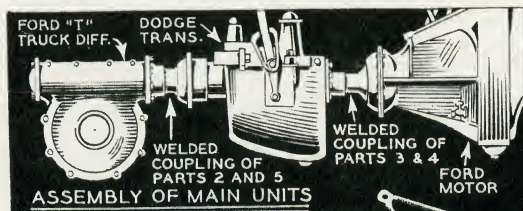
PERHAPS in your own back yard you have an old Model T Ford truck or passenger car that wasn't worth a license tag. If it is a truck so much the better, then all you will need is the transmission from an old Dodge.

The tractor described here is capable of handling any two horse load, at a faster speed than horses and on nominal gas consumption. It should be noted that the plans have been

In order to use a double transmission the worm drive shaft on the Ford must be squared to fit the Dodge universal joint. If a passenger chassis is used for tractor replace the "rear end" with one taken from a "T" truck. Since all parts are numbered on diagram they may be easily identified in assembly. Part "A" in one diagram and part "A" in another are same.

A Twenty Dollar TRACTOR

With T Fords available throughout the country any shop man can easily convert one into a practical tractor.

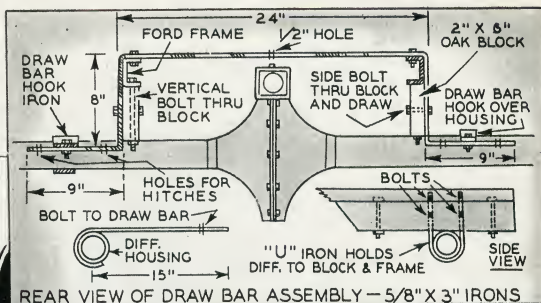


The photo above shows the rear of "Handy Henry" and location of clevis holes. The draw bar is located in the center. Note manner in which differential is mounted to the chassis. The drawings depict the manner in which this is done.

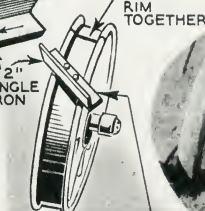
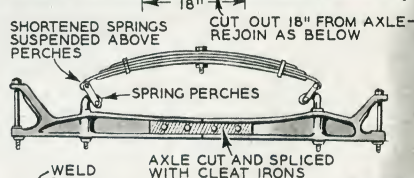
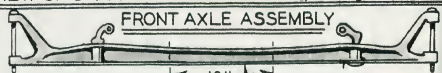
worked out in an effort to build this tractor without undue cost. Where possible, all fittings are made in your own work shop and it is not necessary to seek the aid of an expert machinist at any time. There are, however, several joints that must be welded. If the builder will note these and then have them all welded at once the welder will no doubt make a special rate for the complete job.

This little tractor is not an experiment, but a proven product that will, under normal conditions, handle any farm job done by two good horses and if a good motor is used it will easily handle a three horse load. It is not advisable, however, to overload the tractor as this would slow down the engine and reduce its horsepower output.

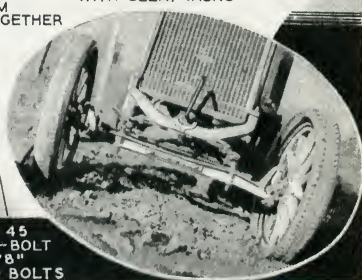
The tractor is made from parts of a Model T Ford truck and an old Dodge transmission. Any make of transmission may be used but the old Dodge is preferred for its rugged build and ability to stand up under long grinds in lower gear. The shifting on this model Dodge, is just reversed from standard, in other words, low gear is where reverse is on later model cars. If you do not have a Ford truck, but do have a passenger



REAR VIEW OF DRAW BAR ASSEMBLY—5/8" X 3" IRONS



LUGS PLACED AT 45 ACROSS WHEEL—BOLT TO RIM WITH 3/8" ROUND HEADED BOLTS



The axle splice is shown above. Since eighteen inches are removed here it is necessary to shorten front springs, too. The radius rod is fastened to bottom of spindle bolts instead of on the top as it was formerly. The flanged rims are built up from old rims which have been welded together at split joint and lugs bolted on to provide traction in soft earth.

car, it will then be necessary for you to obtain a Ford truck differential. Any wrecking yard should supply one with low gears for not more than five dollars. The Dodge transmission should be bought for about \$2.50.

A regular T model passenger car frame is used and the first job is to strip it of all unnecessary parts, then block it up and remove the rear end which will later be replaced by the truck differential. A good radiator and motor are the important parts of the tractor and to aid in cooling a water pump may be installed. Next block up the front end and remove the front wheel assembly and spring. This is then dismantled. The object here is to narrow it up 16 inches to permit shorter turning. With a yard stick or tape find the exact center of the front axle. Then measure 8 inches each way from the

Converted Auto Operates Farm Implements

center, or in other words cut a 16-inch piece out of the middle of the axle. A hack saw will do the job. The axle is then welded together.

Another way that will save the cost of welding is to butt the axle together and bolt an iron on each side, like cleats, running the bolts through the iron and axle. This method is plenty strong as there is no weight directly in the center of axle.

The front tie rod is next. Unscrew the adjustable end and cut 15½ inches from this with a hack saw—rethread the rod and screw the adjustable fitting back on and align the wheels. The small steering rod has 7 inches cut from it and it had best be welded. Lay it aside as there will be a few other things to weld later on.

The front spring is now shortened. Only five short leaves are used and instead of the spring shackles hanging down from the perches they are up and on top as shown in the photo. The object here is to raise the front end higher so as to permit easier cranking and the use of longer spring leaves.

The lower main spring can be cut and welded, however the one used here was made from two old lower springs utilizing one shackle hole in each spring. These are cut 20 inches in length, measuring from the center of oil hole on shackle end. They are then lapped over each other—heated in the center to take out the temper, and a ⅜-inch hole drilled through both pieces for the center spring bolt. The other four leaves are then all bolted to the main leaves as in the original spring and spring clamps used at each end.

The next job is to install the Dodge transmission. First the front stub shaft is removed from the transmission and squared up to fit snugly into a Ford universal joint, which is used next to the motor. The drive shaft and housing is removed from the truck differential and the drive shaft may be discarded. The housing is used by cutting a 2½-inch length piece from the bell end measuring from the edge of the bell back as shown in the drawing. This is then welded to the small metal bearing cover on the front of the transmission. This completes the front universal unit and the transmission may now be set in place and bolted to the motor with the usual bell collar. The shift, however, will have to be blocked up while this is done and also lined up to fit the transmission brace.

The transmission is rigidly braced by using the old rear frame member from the T passenger car frame. This is already curved and is bolted to the front of the transmission

and to the under flange of the frame with studs as shown. The holes are marked by first lining up the shift, then holding the frame member against the transmission and up against the under side of the frame.

We next take up the rear universal unit. Here a regular Dodge universal joint, bell housing and collar is employed. The stub drive shaft or worm gear is first removed from the truck differential and squared up to fit into the female end of the Dodge universal. Be careful, here, not to batter the ball bearing surface on the shaft. It should be squared up to within one-half inch of it. It might be well to have a capable blacksmith do this job and also the front drive shaft that is squared because they must be hardened to the right temperature. After this has been done reassemble the differential.

Next, measuring from the edge of the Dodge bell housing as shown, cut 1½ inches back. Then cut a 1½-inch piece from the rear end of the Ford truck drive shaft housing filing the Dodge stub housing slightly so it will slip inside of this ring. Be sure the bell collar is in between then have this welded all around.

Using a heavy cord one may now line up the whole assembly by looping the cord over the Ford magneto plug and measuring back to the spring perches on the differential. By trying the cord first on one side and then on the other will tell whether or not it is all lined up with the center of the motor. Check this closely as it is important that the whole unit be lined up before completing the rear assembly.

The distance between the under side of the frame and the top of the rear axle housing is 5¾ inches and this is blocked up by using two pieces of 2 by 6 hollowed out a quarter of an inch over the axle housing. Each wood piece, preferably oak, is then drilled and bolted to the under flange of the frame.

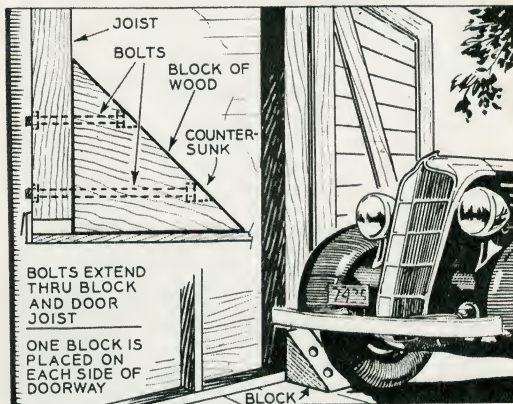
The truck radius rods are now cut off to the desired length and to fit at the side engine hanger bolts. These holes should first be reamed out to half inch. The radius rod is first heated and then bent to fit, then the holes are marked and drilled.

For plowing and heavy loads put the Dodge shift lever in low and let the Ford into high. However, you have another lower gear if needed by shoving the Ford into low. One must use discretion here if the lug wheels are being used, for the low-low exerts such a tremendous power upon the universal joints and shafts that something might snap if the load did not give.

IDEAS FOR AUTO OWNERS

Garage Door Chocks Save Fenders

TO SAVE wear and tear on the fenders of your car while others are backing it into the garage, cut wooden chocks which can be bolted to the door joists on each side of the entrance. While these chocks will not harm the tires even if the car is driven over them, they will warn the driver that the car is too far to one side. The size of the chocks will depend upon the width of the door and the car—the ideal size is that which will just allow the car to get in without touching either chock.—Kenneth Murray.

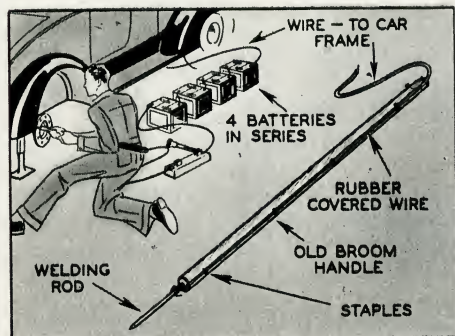
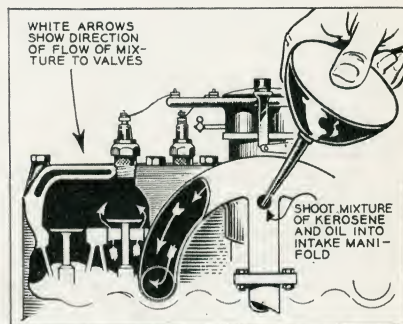


Loosen Inner Tube Patches With Heat

DEFFECTIVE inner tube patches can be removed in a few minutes by taking advantage of the fact that patching cement will burn. Simply apply a thin coat of the patching cement to the surface of the patch, being careful not to get any on the inner tube itself. Ignite this cement with a match. When the flame has died down, the patch can be peeled off easily, without damaging the inner tube. The heat penetrates through the old patch and softens the old cement. A large patch can then be applied.—Albert Machida.

Quick Remedy For Sticking Auto Valves

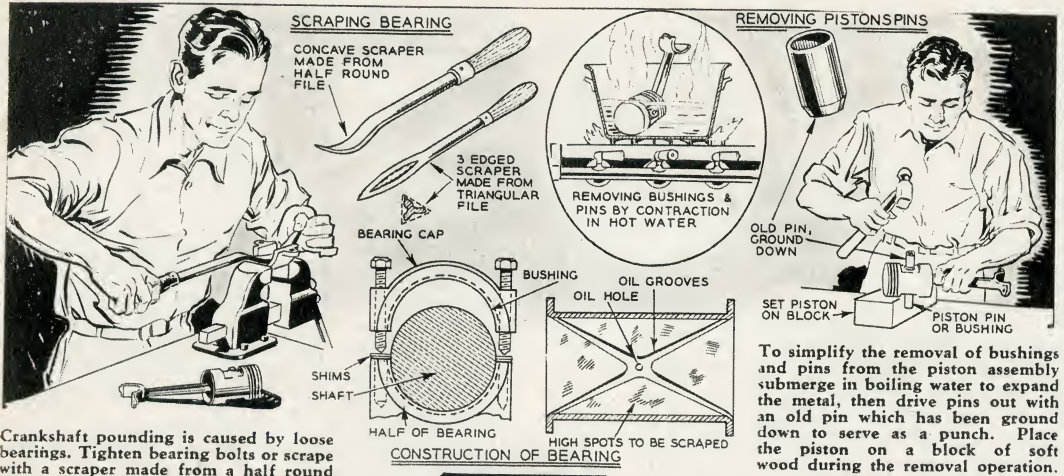
IN TAKE valves of auto engines will sometimes stick in cold weather, especially if heavy oil is used in the crankcase. The trouble can be cleared up in a few minutes by disconnecting the windshield wiper tubing from the intake manifold, and squirting into the manifold with an oil can a mixture of kerosene and thin oil. This solvent oil, drawn through the valves by the engine, will thin out the heavy or gummy oil around the valve stems. The tubing is of course replaced.—Alex Adastik.



Handikink Removes Broken Axle

TO remove a rear axle which has broken off far back in the housing, try this welding method. Drive a short length of $\frac{1}{8}$ " welding rod into the end of a broomstick, and connect to storage batteries or a welding generator, grounding the other terminal to the car frame. Push the broom stick into the housing until the rod touches the end of the broken axle. The surge of current will weld rod and axle together. Open the switch instantly. The axle can now be removed by pulling out the broomstick.—Vernon Tracey.

CHECKING the CAR for Elusive

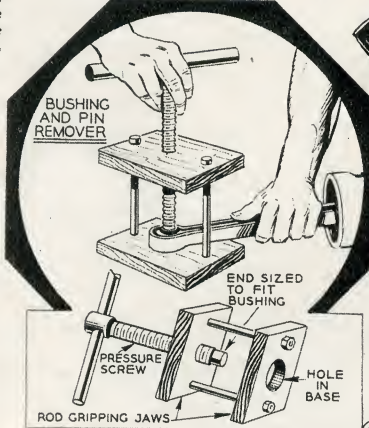


Crankshaft pounding is caused by loose bearings. Tighten bearing bolts or scrape with a scraper made from a half round file as shown above. Use Prussian blue in the scraping process so that surface is made perfectly round and not oval.

NO MATTER how good an automobile motor may be it will eventually get noisy and begin to lose power. While the power factor is very often ignored the presence of noise is most objectionable.

Crankcase pounding, valve hiss and piston slap are the more common causes for a motor to be noisy and lacking in its power output. While these items appear to involve special processing that can only be attempted by an experienced mechanic, it is possible for anyone with a fair knowledge of automobile construction to correct trouble.

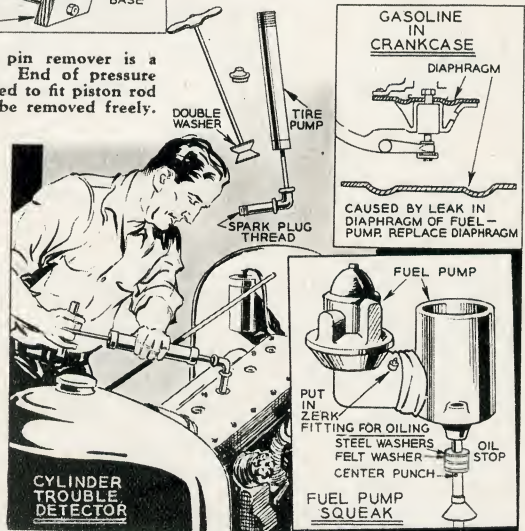
Noise caused by worn bearings can usually be detected by the loud dull sound produced. The same sound is present if they are merely loose, therefore first check for loose bolts and if the trouble is not here take the bearing apart and re-scrape it. A tool for this work can be made from a half round file which has been ground into a concave blade. A similar tool can also be fashioned from a triangular file in the manner made clear by the diagrams. After smoothing off the inside of the bearing sections smear on a thin coat of Prussian blue then re-assemble the unit.



This bushing and pin remover is a handy piston tool. End of pressure screw should be sized to fit piston rod bushing so it may be removed freely.



After completing the scraping of a bushing it should be well lubricated, oil being spread out with finger tips. This completed, bushing may be assembled.



A handy cylinder trouble detector for locating piston knocks and similar noises can be made from an old tire pump provided with double washers and threaded reducer to fit spark plug taps. Fuel pump squeaks can be eliminated as shown.

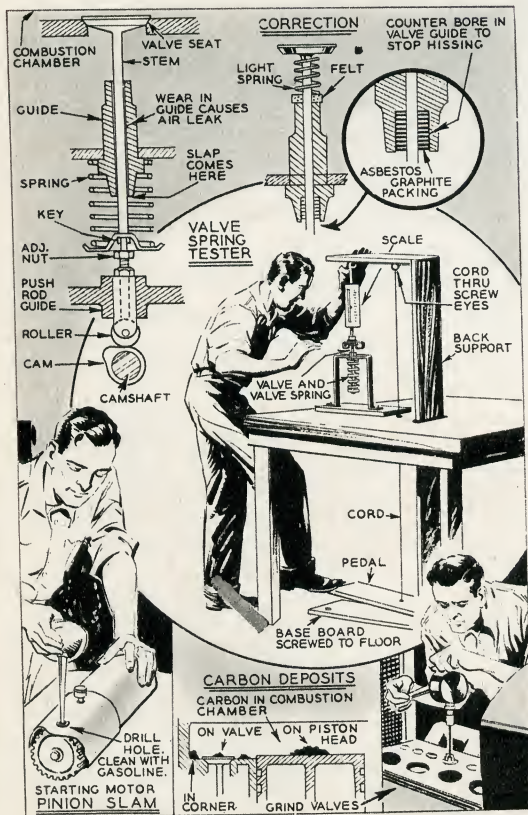
Engine NOISES

by
MORRIS A. HALL

Until now only the most experienced auto mechanic could track down an elusive motor noise. This article tells how you can easily correct these annoying sounds.

Turn the shaft several times in the bearing, then open the sections. High spots will clearly show up and should be removed so that shaft turns freely.

Worn piston pins and piston rod bushings are also responsible for much of the trouble. An old pin ground down makes a handy tool for removing piston pins. A simple screw device similar to the one illustrated on this



All valves must have a uniform spring tension if the motor is to perform efficiently. Springs may be quickly checked on the simple spring balance device shown above. The proper adjustment of the valve tension can be determined by referring to the cross section diagram illustrated at upper left. Asbestos-graphite packing in the counter bore will eliminate valve hiss. The starter motor mechanism should never be oiled. Instead plain gasoline should be squirted into mechanism from time to time. A small hole drilled in motor housing permits access to starter spring and the unbalanced pinion for pouring gas.



Piston slap is often due to one side of the cylinder wall being worn down. The only correction for this trouble is to re-bore all cylinders to the first oversize and use new oversize piston rings. The above diagram shows the cause for pistons to slap.

page will aid in the removal of worn bushings. Placing the entire piston in boiling water for several minutes will expand the outer metal sufficiently so that pins and bushings will come out easily.

Where the piston rings have caused the cylinder walls to wear rough, re-boring is necessary. For this work the proper hand drill attachments should be used to insure a perfectly true surface. When re-boring, grind out the cylinder to the first oversize and secure piston rings to fit so that there is no leakage of power.

It is easy to find the exact cause for the particular noise your car has developed by using a simple cylinder trouble detector. Secure an old auto pump and install a double washer plunger on the shaft, then fit up the end of the pump with a connection threaded to fit a spark plug tap. When a cylinder is suspected remove the plug, screw on the pump then turn over the engine until the pump handle is forced upward. By removing the pan and allowing someone to hold the rod a loose piston can be immediately detected.

In assembling the pistons be sure to lubricate the surfaces of the bearing well by applying heavy oil to the inner surfaces and smoothing out with the finger tips. The bearing sections are next bolted rigidly together

Common Auto Engine Troubles Easily Corrected

so that the vibration of the motor will not cause them to come loose.

It is very important that each cylinder receives its proper quota of vapor so that all pistons will be forced down with a uniform explosion. In order to insure this all valves must be provided with springs of uniform tension. One spring being weaker than the others will result in the motor vibrating excessively. To prevent this, the tension of all valve springs should be tested by compressing with a spring balance installed to a jig similar to the one illustrated in the diagrams. When replacing a spring that has been broken be sure that it is of the same tension as the others. The nut on the valve stem is adjusted until the proper tension is secured.

If valves hiss there is an escape of vapor through the valve guide. To overcome this place a tight fitting felt washer over the guide with a light spring being placed over the stem to hold the washer down. The sealing is completed by packing the counter bore with asbestos-graphite packing.

Even though your car burns high test carbon free fuel it is advisable to clean the carbon deposits from the valves and pistons after each 50,000 miles of driving. If ordinary gasoline is used the valve grinding and carbon cleaning should be attended to sooner. Doing this at the proper time will save you many dollars later on if let go.

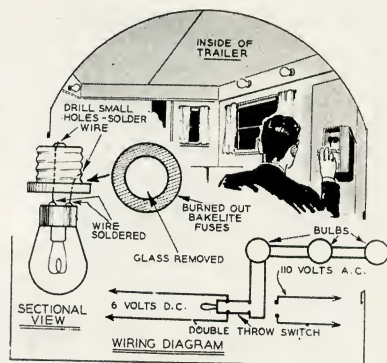
The last of the many elusive automobile noises is that one caused by grease and dirt entering the housing containing the tork spring and gear. Usually the oil is thrown off by the flywheel while the dirt adheres to the mechanism just as soon as the oil is present. To eliminate the tork spring going erratic a small hole is drilled in the top of the housing and plain gasoline squirted into the mechanism. The gas will dissolve the oil and eliminate sudden breaking of starter springs.

From the explanation given here it is clear to see that even the most involved automotive troubles can be remedied by the average person if the work is performed in a systematic manner.

Switch Lights Trailer On A. C. And Battery Current

IT IS possible to use either automobile current or house current, depending upon where your trailer is located, by wiring up the trailer using standard screw sockets. Since it is impossible to install auto lamps in these, secure several blown fuses and wire up the auto lamps to the old fuses as shown. Sealing wax will hold the bulbs rigid. A double pole—double throw switch permits changing from 6-volt to 110-volt current, depending on

current available.—John G. Mery, Shelton, Mass.



Charcoal Filters Drinking Water

A PRACTICAL water filter can be put together in a few minutes from a five-gallon oil container and several pounds of charcoal. Cut the top off the can and attach a wood block so as to form a well fitting lid. A faucet is provided at the bottom of the can so that the filtered water may be removed. Break up some of the charcoal and place this in the bottom of the can; then fill the container with water. —Lofton Stallings, Hobbsville, N. C.

Handy Kinks For The Trailer Travelers

Here's how to tell the polarity of a battery, to make worn starter bearings as good as new, to get extra miles out of tires, to cut down the number of punctures, to use old tires on trailers, and to make a trailer hitch that's absolutely safe.

HOW TO DETERMINE POSITIVE POST ON BATTERY

IF BATTERY IS BEING PUT INTO CAR, CONNECT TEMPORARILY AND TURN ON LIGHTS. LOOK AT AMMETER, IF IT REGISTERS DISCHARGE IT IS CONNECTED PROPERLY

POSITIVE POST USUALLY HAS A COATING OF GREENISH CORROSION

NEGATIVE POST HAS WHITE CORROSION IF ANY

FIG. 1.

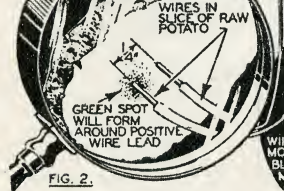
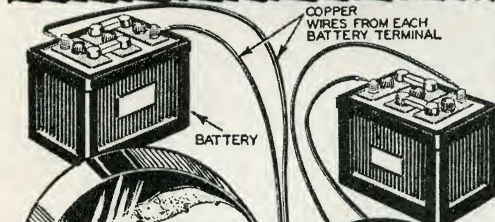
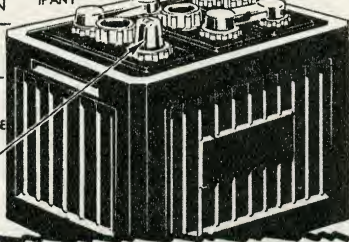


FIG. 2.

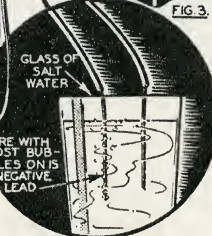


FIG. 3.

BATTERY POLARITY can be determined in a number of ways. Where battery is in car, it is connected properly if ammeter shows discharge when lights are on. Positive post usually has a coating of greenish corrosion; negative post has white corrosion if any.

Negative ends of lead connector straps become more discolored with age. Potato and salt water tests shown above are easy to make, and give positive indications.

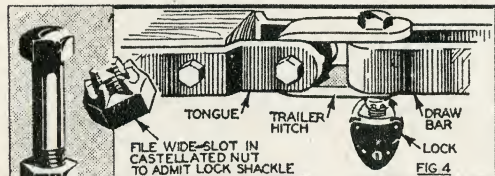


FIG. 4.

TRAILER HITCH bolts sometimes fall out, if put in carelessly, and accidents result.

Get a steel machine bolt $\frac{1}{2}$ " in diameter and 2" long, with castellated nut. Drill a $\frac{3}{16}$ " hole near thread end of bolt, and countersink so that shackle of small padlock will slide through easily.

With this padlock there is no danger of the trailer coming loose.

SAFETY LOCK-BOLT ASSEMBLY

BEARINGS

are probably worn when your starting motor loses its pep, seems to growl its way around.

To make a simple repair, clean each bearing with gasoline, and then with soldering paste. With a blow torch carefully bring the temperature of the casting to the point where bearing will melt solder.

Apply solder until bearing is well tinned, and starter is good as new.

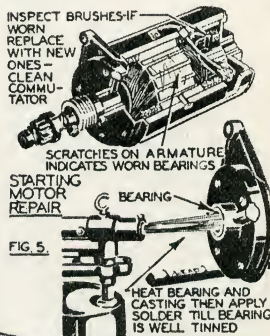


FIG. 5.

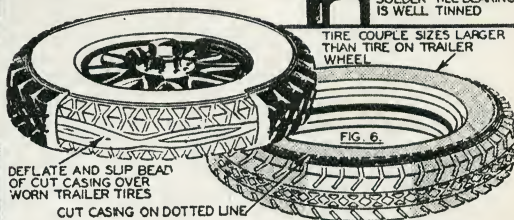


FIG. 6.

TIRES that are badly worn can be made to give many more miles by putting them inside another old casing. Cut beads off tire a few sizes larger than the one on the car, and slip over deflated tire.

TUBES will not last long where tire casing is badly cut or bruised. If casing is worth repairing, clean inside with gasoline and apply several coats of rubber cement.

Clean a good inner tube in same manner and apply cement. Carefully place tube in casing and inflate as much as possible.

When cement dries, trim tube down to rim of tire, insert a good inner tube; mount tire.

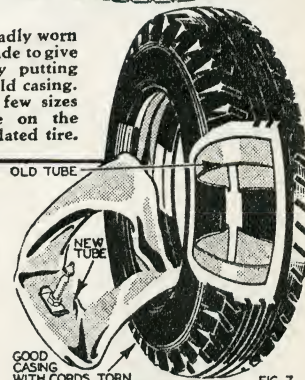


FIG. 7.

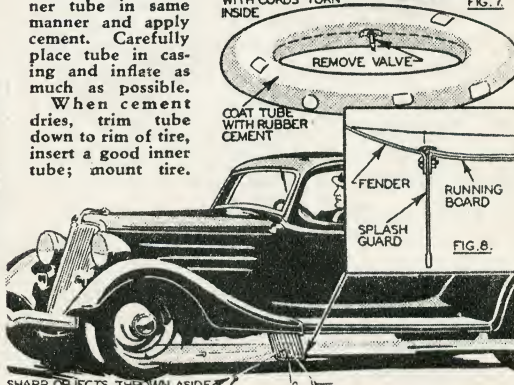
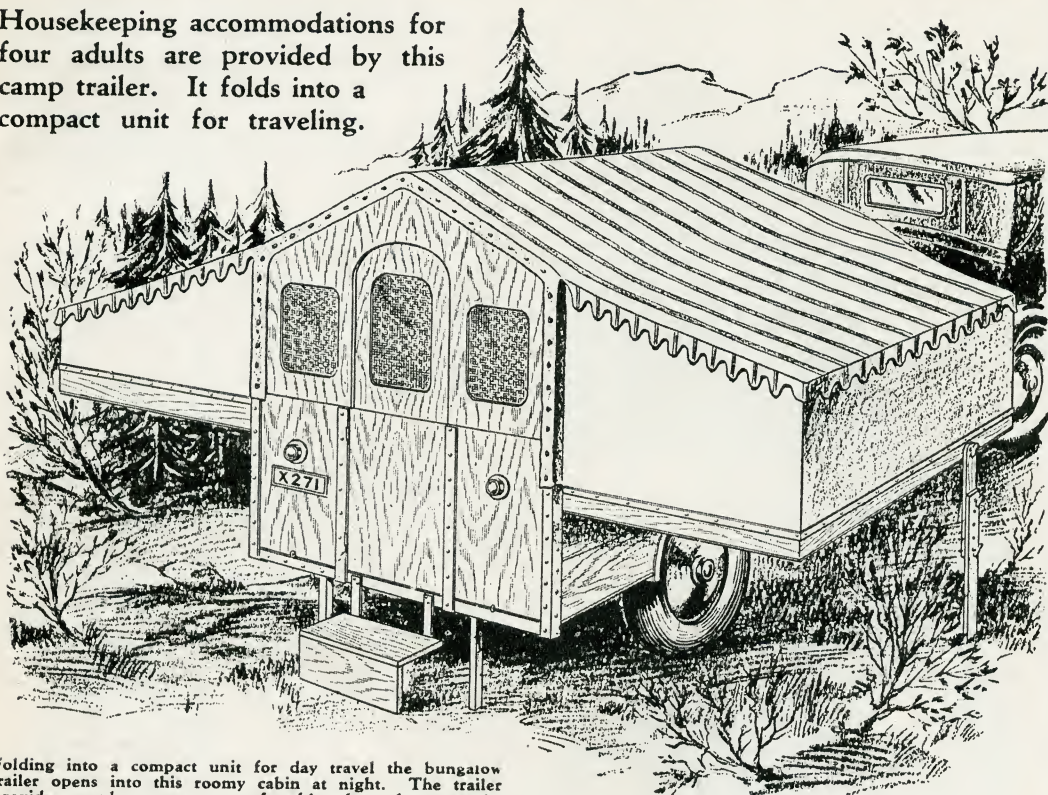


FIG. 8.

PUNCTURES have been found to occur more frequently in rear tires of autos, because front tires kick nails up. Splash guards mounted behind front wheels will bounce nails back, protecting rear tires.

BUNGALOW AUTO TRAILER

Housekeeping accommodations for four adults are provided by this camp trailer. It folds into a compact unit for traveling.



Folding into a compact unit for day travel the bungalow trailer opens into this roomy cabin at night. The trailer provides ample room to comfortably sleep four people.

by DICK COLE

UNDOUBTEDLY the neatest and most convenient way to "autocamp" is with a self-contained, built-in trailer. A number of excellent camp-trailers are offered on the market, and are commended for the consideration of anyone planning an extended camping trip. But there are those whose pocket-book will not stand even the nominal cost of a ready-made trailer; and there are legions of amateur builders who find keener joy in putting to practical use creations of their own handicraft. To these, this article on how to build a bungalow trailer will be of particular interest.

The cost of building this trailer is not excessive—no more than the cost of a complete, reasonably-priced camping outfit with tent, etc. Its advantages over the running board camping outfit are manifold.

First, the members of the camping party are not packed in like sardines with the

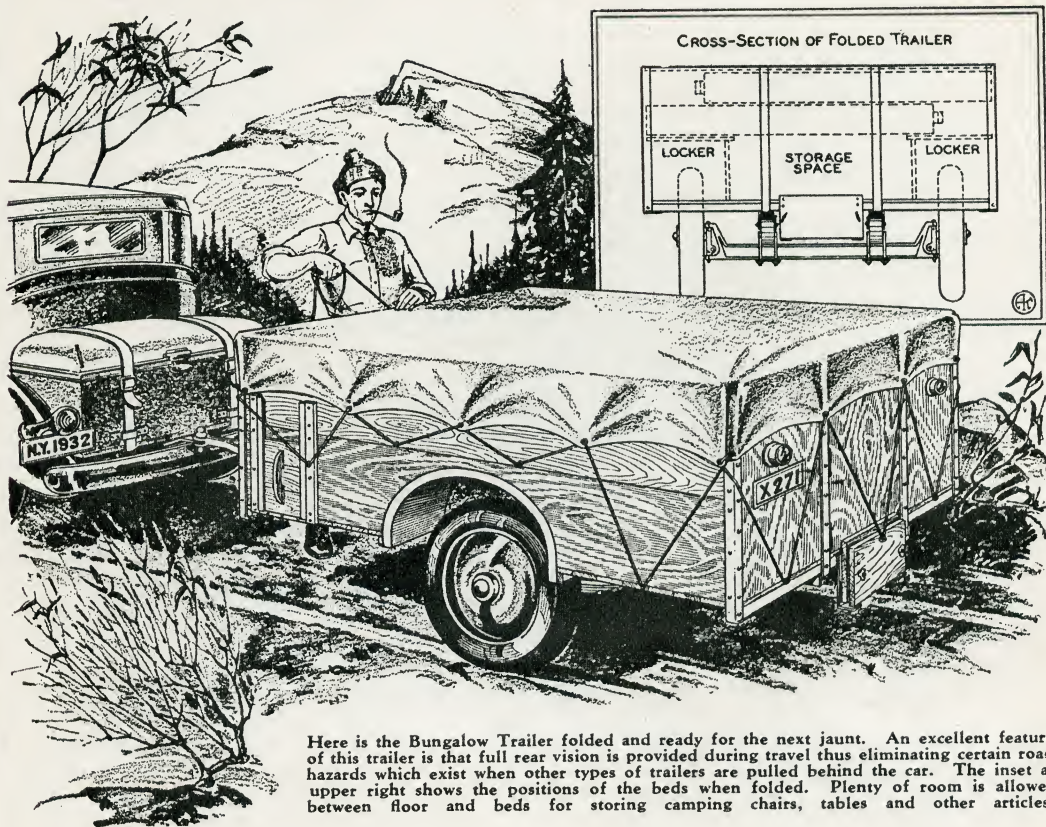
camping paraphernalia. No ungainly parcels are lashed to the car to chafe the paint-work. The beds are always off the ground—one does not have ticks and crawly things for bed-fellows.

When passing through cities with points of special interest, the trailer can be checked at a parking station, leaving the car free for side trips. And, above all, the bungalow trailer offers home-like conveniences that cannot be had by tent camping.

It is a mistaken idea to assume that a trailer materially impedes traveling. It is a fundamental engineering law that more weight can be hauled than can be carried by a tractive machine. No doubt an automobile is put to more undue strain carrying a 500-pound camping outfit, than by hauling a 1,000-pound trailer.

And, too, if the trailer is low-built, and is hooked up close to the towing car, the official speed limit of any state can be maintained without undue effort. The only time the trailer will make its presence felt is on

FOLDS UP FOR TRAVELING



Here is the Bungalow Trailer folded and ready for the next jaunt. An excellent feature of this trailer is that full rear vision is provided during travel thus eliminating certain road hazards which exist when other types of trailers are pulled behind the car. The inset at upper right shows the positions of the beds when folded. Plenty of room is allowed between floor and beds for storing camping chairs, tables and other articles.

steep grades, when a change to lower gear will have to be made a little sooner. But makers put gears in the gearbox for just that purpose.

The cost of building this bungalow trailer will depend somewhat upon the builder's shopping acumen at second-hand shops. The primary unit that enters into the construction is the front axle assembly and part of the frame from the chassis of a junked car. Scores of these are available for a song at any automobile graveyard. Various sizes of angle-iron are used. Often this can be picked up cheaply at places dealing in second-hand building material.

Ply-board is used extensively. Water-stained or slightly damaged ply-board can often be had at lumber yards at greatly reduced price. But even if all new material is used—except the axle, wheels, etc.—the cost will not exceed \$40.00. The biggest item that enters into the construction is one's time.

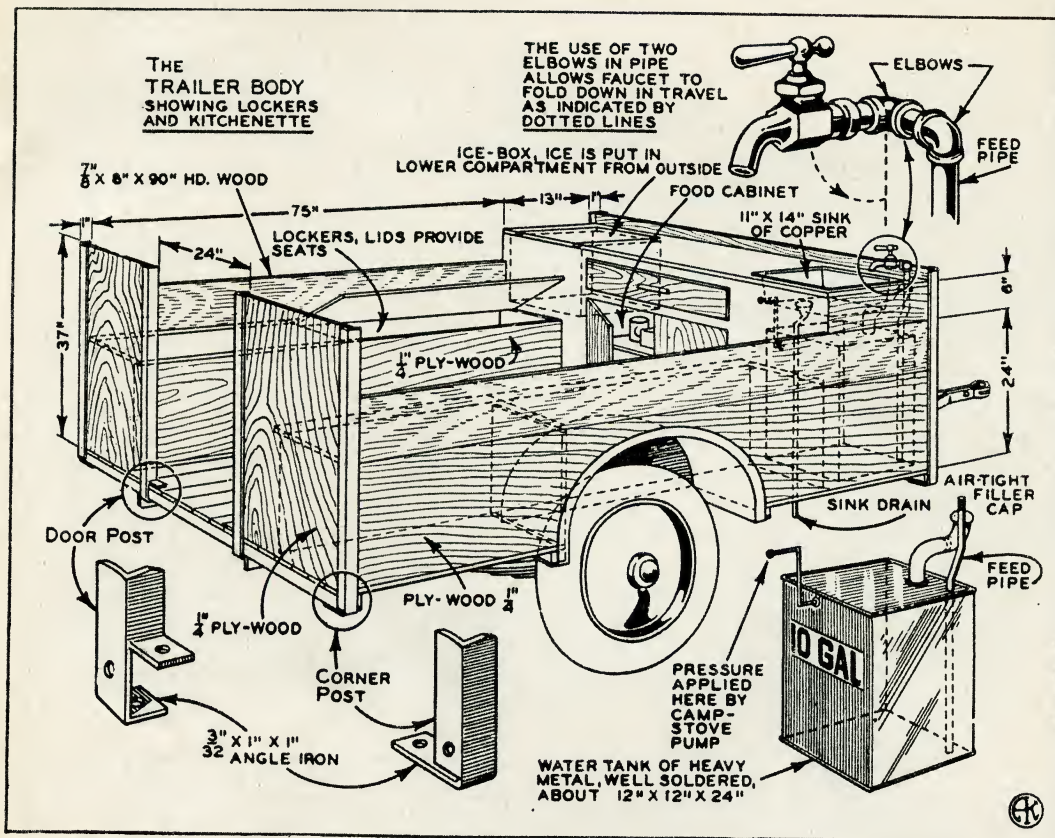
The first consideration of the builder is the

selection of the front axle assembly. The style shown has semi-elliptical springs. Axles fitted with transverse springs, as the Model T Ford, are not suitable. Axles with cantilever type springs, as old model Chevrolets, are not desirable. Many light cars have the semi-elliptical.

Points to consider in the selection are: Low hung frame, reasonably well-fitting shackle bolts, good wheel bearings and wheels fitted with a common size, small tire. It is highly desirable to have the same size tires on the trailer as on one's car. The car spares will then do for the trailer in case of a puncture. Sloppy king bolts and bushes are not objectionable; the axle will be made rigid at this point.

After one has found the axle he wants, and made a dicker with the junk man, the frame is cut through with a hack-saw 4 in. back of the shackle bolt, and the assembly hauled home. The next operation is to lock the wheel axles rigidly to the axle proper. One

Plumbing System Occupies Front End of Trailer



The plumbing installation details appear in the above diagram. Water storage is provided by a ten gallon metal tank. The tank is rendered air tight and connected to the pump of the camp stove pump so as to provide pressure for raising water to the sink. Storage cabinets, sink and stove are all located in the front end of the trailer. Refrigerator is refilled with ice from the outside.

of the drawings shows how this is done. Invariably the king-bolts are too hard to drill—the temper must be drawn first. So the bolts are withdrawn and heated to cherry red in a fire. They are then covered with ashes and permitted to cool down slowly.

After replacing, the bottom nut is drawn up as tightly as possible. Then $\frac{5}{16}$ in. holes are drilled through the stub axle and the axle yokes, and tight-fitting steel pins are driven in. Of course, the wheels should have been lined up first. A $\frac{1}{4}$ -in. toe in is permissible. After the axle has been made rigid, all steering arms and rods can be removed.

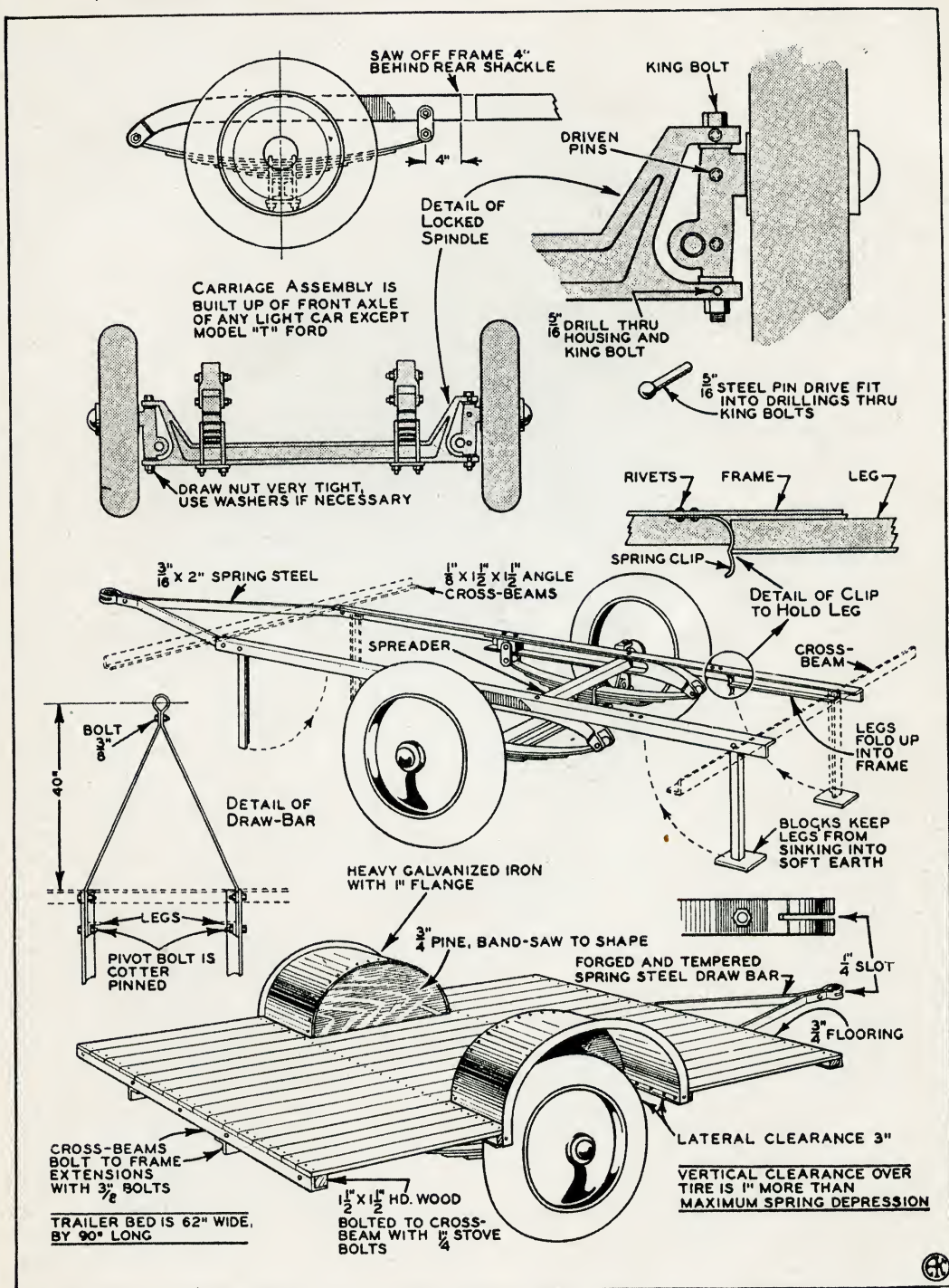
Construction work now begins in earnest. Two lengths of $\frac{1}{8}$ "x2"x2"x90" angle-iron are bolted to the short section of the original car frame. Three $\frac{3}{8}$ " flat-head machine screws are used on each side. The heads are counter-sunk, and the nuts should be riveted over after drawing tightly. $\frac{3}{32}$ "x1 $\frac{1}{2}$ "x1 $\frac{1}{2}$ " angle-

iron is used for the legs, which fold up into the frame and are held with spring clips. Several laminations of old phonograph motor spring will make these clips.

The drawbar is now made; $\frac{3}{16}$ "x2" spring steel stock is used here. It is best, perhaps, to have a blacksmith, or a shop specializing in auto springs, shape this drawbar. Note that the bar terminates in a slotted loop, which will permit quick attachment to the bar of the towing car. One of the leg bolt-holes can be used for the drawbar. A second bolt, however, is necessary. The nuts of these bolts, too, should be riveted over.

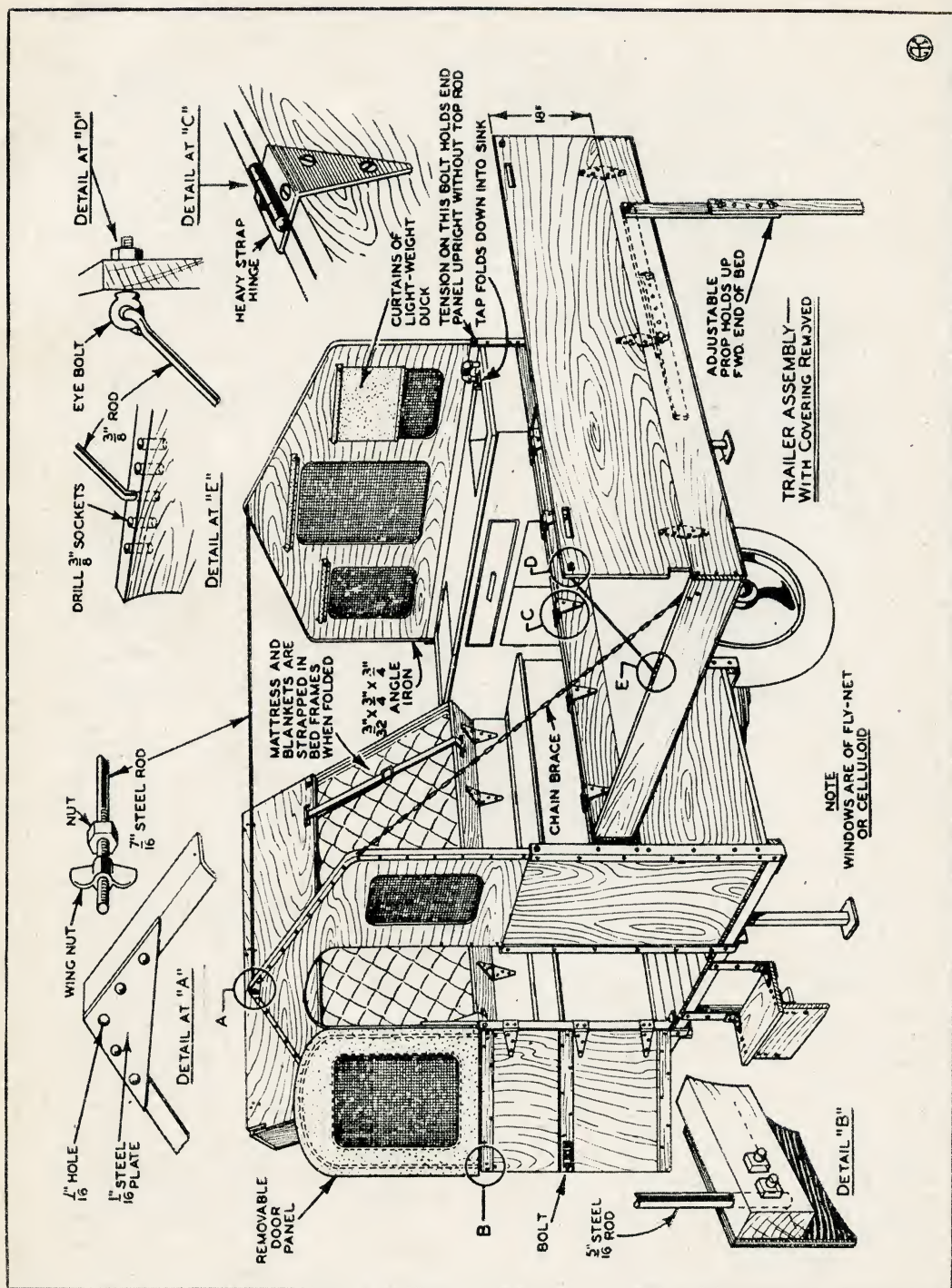
Now turn to the drawing showing the flooring in place. The cross stretchers are four lengths of $\frac{1}{8}$ "x1 $\frac{1}{2}$ "x1 $\frac{1}{2}$ "x62" angle-iron with a square strip of hardwood bolted into the angle. The purpose of the wood is to provide stock to which to nail the floor boards. The cross members are bolted to the main

Bungalow Trailer Built on Light Auto Axle



The front axle assembly from any light car provides a satisfactory truck for the trailer chassis to roll on. Steel pins are driven through king bolts so that spindles remain rigid. The front axle can be salvaged from any make or model car except a model T.

Detailed Arrangement of Trailer's Interior



This prospective view of the completed Bungalow Trailer shows operation of folding beds. Porch swing chains provide satisfactory brace for supporting beds. Adjustable props supply additional support for opposite end. Awning canvas covers top and sides of rolling home with celluloid serving for window panes. Angle iron is used for reinforcing end structures of the trailer.

Canvas Tarpaulin Covers Trailer When Folded

stretchers and the nuts riveted over; $\frac{3}{4}$ " pine will serve as flooring. Afterward this can be covered with battleship linoleum if desired.

The construction of the mud-guards is quite obvious. Heavy galvanized iron is shaped over semi-circular pieces of wood and screwed to it at close intervals. The galvanized iron should overlap the side about 1". This 1" overlap is then peaned back to form a flare. Later this is screwed to the side-wall of the trailer. The clearance between the top of the tire and the mud-guard should be about $\frac{1}{2}$ " more than the maximum depression of the car spring; 3" is ample for the lateral clearance. The width between the mud-guards should be as great as possible—2" clearance between the side-walls of the tires and the semi-circular boards is sufficient under normal conditions, since tire chains will never be necessary on the trailer wheels.

Another drawing shows some of the stages of the cabinet work. The perspective drawing shows the general layout and gives the salient dimensions. The insert drawings show hidden detail construction, so a long-winded discussion of all the detail work would be superfluous.

The kitchenette at the rear is one of the main features. Incorporated in the space 13"x30"x60" is an ice box; a drawer for kitchen utensils, cutlery, etc.; a cupboard for pots, pans, and foodstuffs; a 5"x11"x14" sink; and a ten-gallon water tank. The location of these are designated on the drawing.

The ice box compartment should be lined with a heat insulating material—balsa wood, cork, asbestos, magnesium. The ice is put in through a door on the outside of the trailer. While the cooling effect is not as good with the ice below the foodstuffs, it will serve satisfactorily. The foodstuffs are accessible through a hinged lid on the top of the cabinet.

The water tank, and its operation, is a rather unique feature. The tank fits in the lower, right-hand corner of the cabinet. The tank can be approximately 12"x12"x24". An auto junk yard will provide the gooseneck filler, which will permit the tank being filled from outside. The water pipe is fitted with two elbows at the top so that the faucet can be turned down into the sink when the trailer is folded. Air pressure is applied to the tank by leading a copper tube to a convenient point on the front of the cabinet. A tire valve is soldered to the end of the pipe. The ordinary

camp stove pump will contribute the pressure.

Note that the corners and the door opening are reinforced with angle-iron. And note particularly the $\frac{7}{8}$ "x8"x90" hardwood stretchers which give solidity to the body. Lockers with hinged lids are built over the wheel housings. These serve for storage space and for seats. The seats can be upholstered with thick felt and leather. Again, the junk yard will provide the leather.

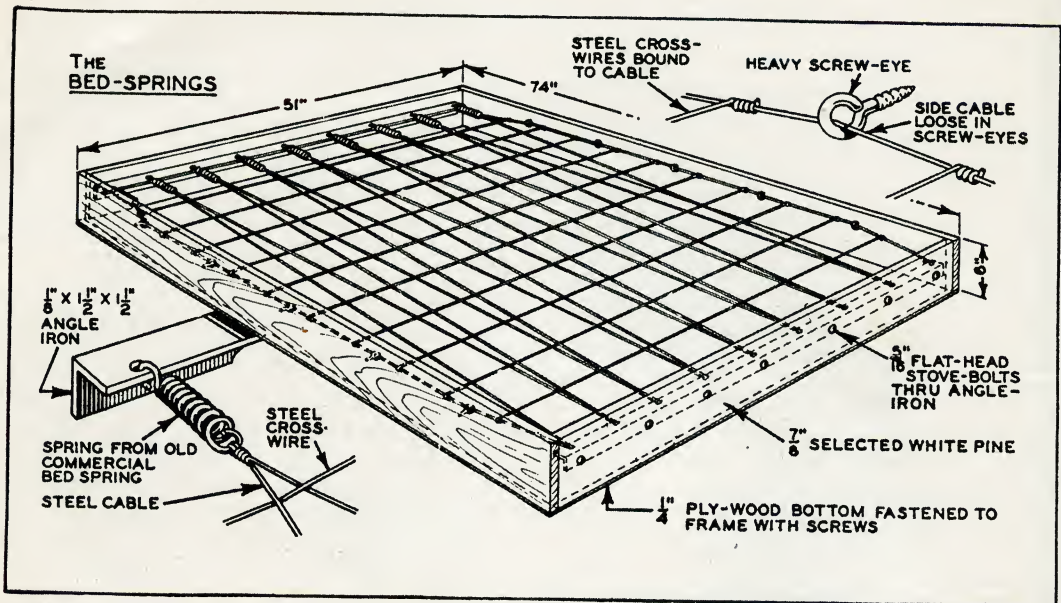
Look at the drawing showing how the folding beds are built in, and the erection of the front and back walls. Note how the beds are hinged to the hardwood stretcher. They are not symmetrical. To design the beds so that they will fold one on top of the other, it is necessary that one be higher than the other when opened. This means that they must be hinged differently.

The upper section of the end walls is $\frac{5}{16}$ " ply-board and is hinged to the lower, permanent section so as to fold inward. The edge of the ply-board is faced with $\frac{3}{32}$ "x $\frac{3}{4}$ "x $\frac{3}{4}$ " angle-iron. A 94" length of $\frac{1}{16}$ " galvanized iron round rod is stretched between the tops of the end walls, and later serves as a support for the canvas roof. Windows can be cut in the end walls and celluloid or fly-netting with roll curtains used here. It is not well to use celluloid for the middle, rear window, as the camp stove will be located at this point and there is a fire hazard.

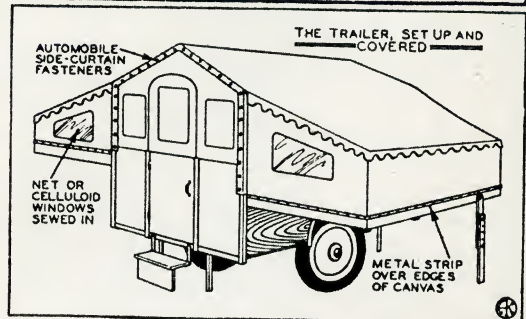
Note that a chain supports the beds at one end. However, chain cannot be used satisfactorily at the other end, as the cabinet forms an offset, and the chain would not offer a direct support. A folding leg on the outside provides a solid support. Note that leg is adjustable to uneven ground. The construction of the folding side wall panels is obvious. The oblong holes in these panels are for straps.

Now for the detail construction of the beds. A wooden frame is built of $\frac{7}{8}$ "x6" pine. The overall dimensions of the frame are 6"x51"x74". $\frac{1}{8}$ "x1 $\frac{1}{2}$ "x1 $\frac{1}{2}$ " angle-iron is bolted to the inside of each end piece, and light, steel cable is laced between the two. Stiff springs at one end provide the necessary tension. The extreme side lacings pass through screw-eyes, and the lateral lacings are bound to the cable—not to the screw-eyes. A cotton or kapok mattress is used on the spring mattress.

Diagram Shows How Folding Beds Are Built



The bed frames are constructed as shown from white pine boards. Angle iron, with holes drilled at six inch intervals, is bolted inside the frame for attaching the homemade spring. Steel cable is threaded back and forth in a cross-hatch manner and anchored to small steel springs. Right—Diagram shows trailer assembled with beds opened and ready for night's stop.



Study the drawing which shows the bungalow trailer partly folded, and illustrates particularly how the mattress and blankets are strapped in the bed frame before folding. The sketch shows, too, how roller curtains are used at the windows; the removable, canvas panel at the door; and the folding steps.

One of the illustrations at the opening of this article shows the trailer completely folded. After the beds have been strapped and folded in place, the end walls fold down over them. A water-proof tarpaulin is lashed over the whole. The end elevation drawing shows the ample space beneath the beds in which to stow additional duffle—suitcases, and the like.

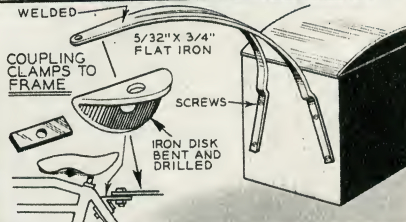
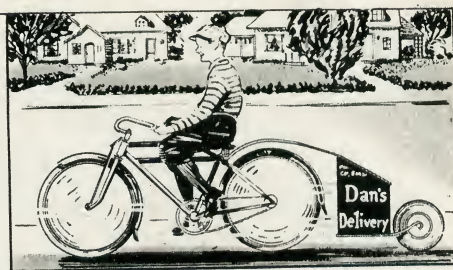
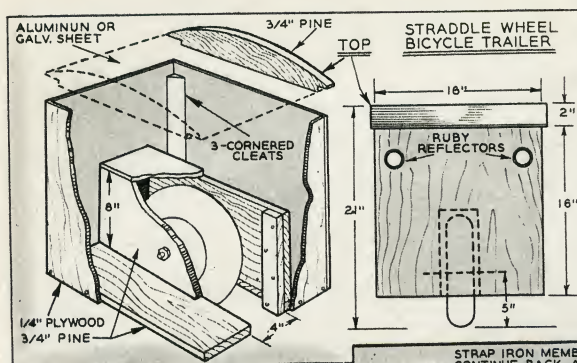
One more drawing finishes the job. The canvas work is quite obvious. The pattern can readily be determined, and the sections basted together. Then a tent and awning shop can do the machine sewing. The cost of this is trivial. Note that the canvas is attached permanently to the bed frames, but is fastened to the end walls with patent fasteners. When folding up the trailer, the canvas is detached from the end walls and folds up with the beds. A scalloped, awning

border around the edges of the trailer enhances its appearance.

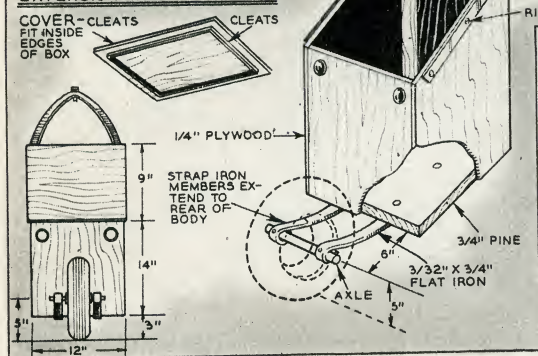
There! Now we've got a "rolling home." Regarding the drawbar attachment. The design of automobiles is so variable that no fixed design can be offered. But if one will drive one's car to a shop specializing on spring bumpers, the mechanics there can quickly dope out a suitable means of attaching the drawbar. Maybe one can pick up the fittings at the old junk yard. Many old-time cars were not factory equipped with rear bumpers; these were attached as an accessory. The usual fitting consisted of an expanding wedge within the channel of the car frame. If these fittings can be obtained, it will be a simple job to hook up the drawbar to them.

Completed, this trailer affords comfortable accommodation for four adults. At night, a curtain can be stretched down the middle of the bungalow to offer more privacy.

Handy Trailers Speed Bicycle Deliveries



EXTENSION WHEEL TRAILER



The bicycle trailers shown here need little explanation as can be seen by the above illustrations. Make the trailer boxes of plywood and mount the doonut airwheel in either straddle or extension fashion. Two forms of wheel suspension are shown.

Block Simplifies Jacking of Car

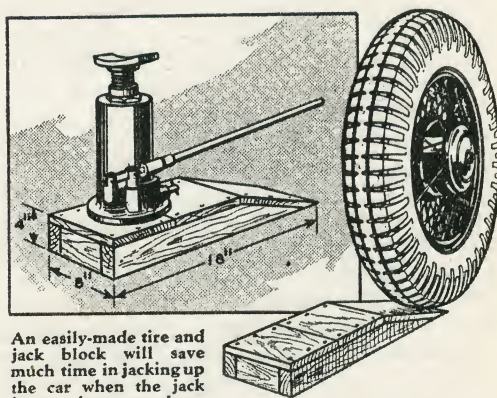
FOR the youth who does the neighborhood chores a bicycle trailer will prove of much assistance in hauling ice and groceries. Both trailers described here employ a single wheel making it possible for them to follow narrow paths. With the conventional two-wheel trailer this is not possible.

The builder has a choice of wheel mountings, in making the trailer, which best suits his requirements. One trailer features the straddle wheel while the other offers more carrying space, but has the wheel mounting projecting in the rear.

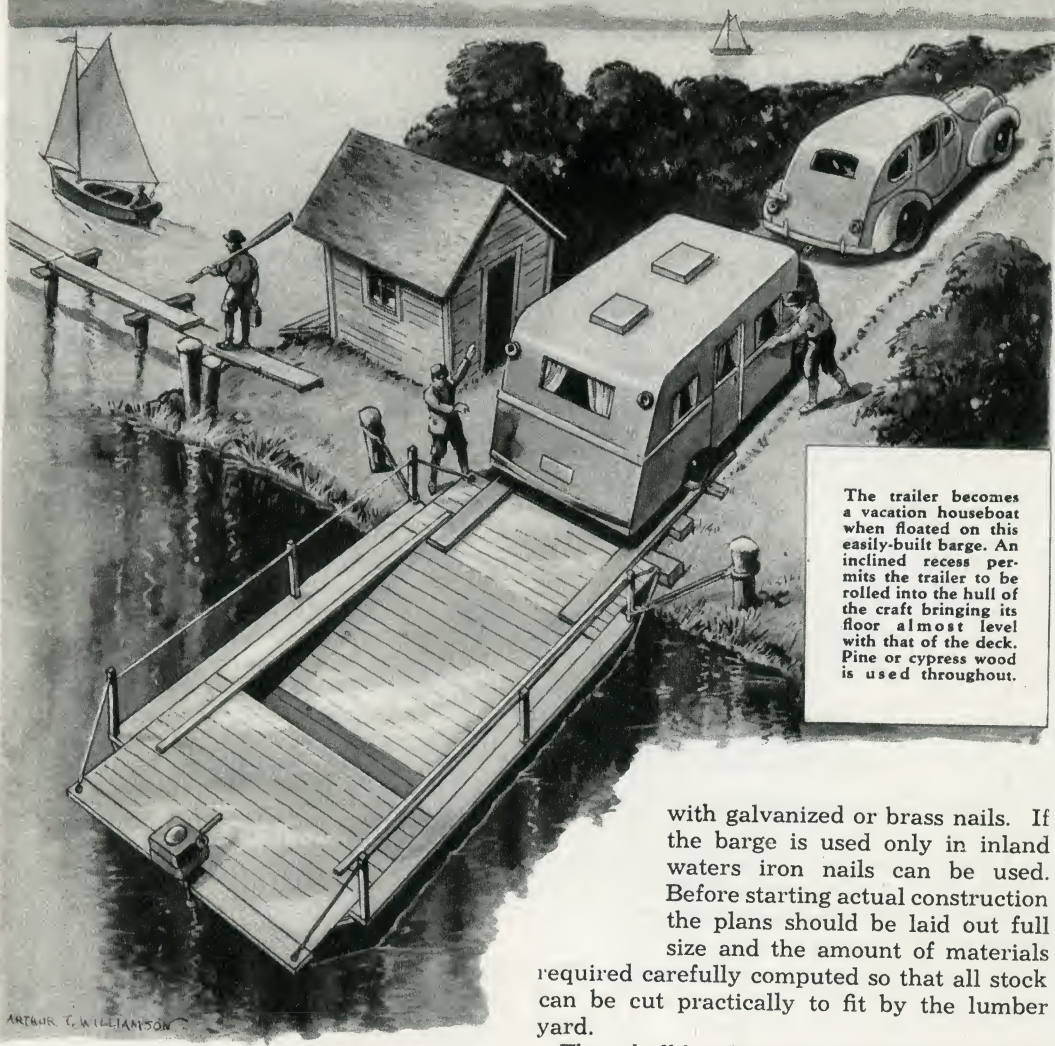
In constructing the straddle wheel trailer first make a plywood box measuring 16 inches square with a well allowed in the center for the doonut air wheel. Make the towing bar from two lengths of strap iron welded as indicated and arranged so as to fasten to the coupling located on the bicycle frame just under the saddle. The rear wheel trailer is identical to the straddle type except that parallel bars support the wheel. The completed trailers are painted in brilliant enamel.

PLACING a jack under a car having a flat tire is very often a painstaking job since the compressed jack is very often higher than the axle. A small wedge shaped block carried in the car will eliminate this difficulty. Placing the jack in front of the flat tire it is necessary only to drive the wheel up on the block which then allows the jack to be easily inserted under the car's axle.

The block is made from a length of 2"x4" stock. Two pieces are cut to 18" lengths. a 4" piece inserted in one end and 1" boards nailed on the top. The block will easily withstand the weight of the heaviest car or trailer.



BARGE CONVERTS TRAILER



The trailer becomes a vacation houseboat when floated on this easily-built barge. An inclined recess permits the trailer to be rolled into the hull of the craft bringing its floor almost level with that of the deck. Pine or cypress wood is used throughout.

by A. T. WILLIAMSON

ANY ambitious trailer enthusiast can convert his trailer car into a unique houseboat for summer vacation use by building this simple trailer barge. Driven by an outboard motor the barge is capable of traveling at speeds of six miles-per-hour on smooth waters. Shallow-draft construction permits it to be floated in three feet of water without danger of the hull striking bottom.

Two inch planks are used in constructing the sides of the barge. Bulkheads are cut from similar stock and the frames assembled

with galvanized or brass nails. If the barge is used only in inland waters iron nails can be used. Before starting actual construction the plans should be laid out full size and the amount of materials required carefully computed so that all stock can be cut practically to fit by the lumber yard.

Three bulkheads are required and these are cut to measure 8 feet 8 inches in length. Their width is 24 inches. If a single plank of this width is not available two planks fastened together with 2 by 4-inch end pieces can be substituted. For the side, two 12-inch planks may be used if the 24-inch size is not available. In this event it is important that you calk the seams to prevent excess leakage. Limber holes should be provided in all bulkheads so that the barge can be pumped dry from time to time.

After assembling the frames you are ready for the planking. For planks, six inch widths are suggested since there is less danger of the wood swelling and buckling. The thickness of the planking is not important so long as

INTO SPORTSMEN'S HOUSEBOAT



Powered by an outboard motor, the trailer barge is capable of traveling six miles per hour on smooth waters. It is the ideal craft for the trailer traveler and sportsman.

it is at least 1 inch. In most instances this will be sufficient. The planks are nailed in place so that one firmly rests against the other; care should be exercised here since open planks will result in a barge that will constantly require baling.

To provide sufficient support to the bulkheads, lengths of 2 by 4-inch stock are driven in place and fastened securely with large nails. Fastening the planking down to these pieces will add additional strength to the hull and at the same time reduce calking work. One of the simplest ways to calk the barge is to apply a coat of old paint to the plank edges as they are nailed down.

After completing the hull, deck construction can be started. It will be noted that the center of the barge is recessed and provided with an inclined plane. This permits the trailer to rest down in the hull at the same level as the deck. The opening in the deck for the inclined plane should be sufficiently wide so that any trailer can be accommodated. An ideal size for this opening is 6 ft., 6 in. by 10 ft.

The inclined plane or ramp can be made from practically any stock which you may have on hand so long as it is heavy enough to support the trailer. A frame made from 2-in. by 4-in. material will provide a suitable

foundation on which to mount the ramp's planking.

The neck need not be of heavy stock if the hull has been rigidly constructed. Inch or three-quarter stock can be used for this purpose. Be sure that you allow several well holes or trap doors in the deck so that the craft can be drained from time to time. If sufficient limber holes are provided in the bulkheads one well in the deck will be sufficient. The barge can be weighted on the end so that all water runs to the well opening where it can be baled out with a bucket.

The catwalks are constructed last since they are optional equipment, but valuable if children are around. If catwalks are planned it is advisable to insert three 2 by 4-inch stringers across the hull before installing the deck so as to provide a suitable support for them. The walks are merely $\frac{1}{8}$ by 12-inch planks fastened to the protruding stringers; the width of 12 inches is optional and can be increased if desired.

Deck railing on the catwalks involve little

Trailer Houseboat Requires No Complicated Fittings

detail. The posts are nothing more than 2 by 4's drilled at the top and center to pass a wire cable. One end of the cable is anchored to the catwalk while the other end is threaded through the post holes and anchored to the opposite end with a turnbuckle. A rope railing is threaded through the center post holes and knotted at each end.

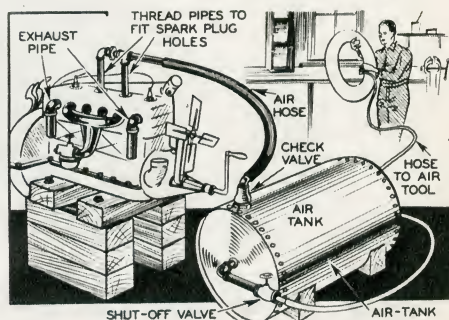
With the trailer barge completed so far as actual construction is concerned, it is ready for painting. A rather thick paint is advised so that any possible open seam will be sealed

by the paint. Placed in water for a few days before being put into use will allow the craft sufficient time to swell and close seams which may be subject to leakage.

The trailer car is rolled onto the barge and chocks placed under the wheels to prevent its moving. An apron on the aft end of the barge will permit the outboard motor to be attached without difficulty. While no speed can be obtained with this arrangement it is nevertheless satisfactory for trailer-water cruising or for sportsmen's use.

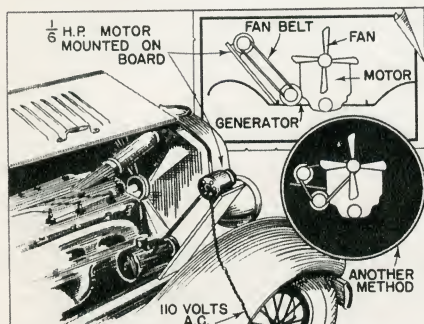
Auto Engine Is Air Compressor

AN AIR compressor which generates its own power can be made from any old four-cylinder auto engine. Two cylinders act as engine, and two compress the air, delivering a steady pressure of 50 lbs. Remove the exhaust manifold, and replace with pipes on the cylinders that are firing. Use the intake manifold as it is, shortening the stems of the compressor intake valves so they do not move. If the firing order is 1-3-4-2, cylinders 2 and 3 are used as compressors.—John Stark.



Electric Motor Helps Charge Car Battery

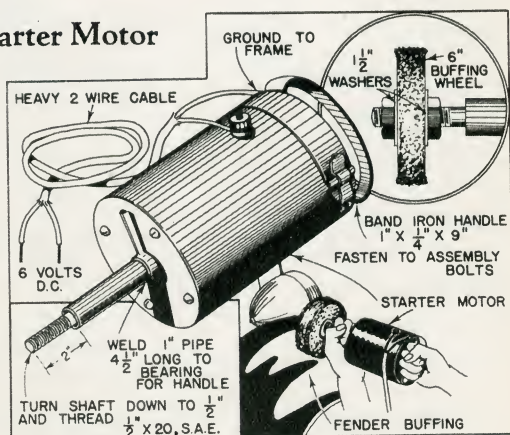
WHEN your car battery is down, here's a kink that will bring the battery up in a short time. On a small board mount an electric motor having a V-belt pulley. Remove the fan belt from your car engine, and connect electric motor and car generator together with it. The length of the board should be such that the weight of the motor tightens the belt. The ammeter will tell you if the generator is being turned in the correct direction.—R. F. Jennings.



High Speed Auto Polisher Uses Any Starter Motor

POLISHING and waxing of a car, if done by hand, can be a very tedious job. With this starter motor-powered buffing wheel operating directly from the car battery, a brilliant polish may be obtained in an hour.

Turn down the armature shaft to take a standard 6" buffing wheel. Two handles are fastened to the starter in the manner indicated by the sketches. Connect the starter to the battery with long, flexible No. 14 rubber covered leads. A heavier wire would draw more current than is needed here. A switch may be mounted on the starter if desired.—Lawrence Kay.



"CABINETTE" A Rolling

Although every sportsman cannot afford his own hunting lodge he can, though, build this rolling cabin and tow it to his favorite hunting or vacation spot. In many localities this trailer can be built for \$50.

THIS cruise trailer was designed to do but one thing, and to do that thing well: Furnish a comfortable traveling accessory to the modern sportsman in which he could live.

There is room enough for four bunks, although only two have been shown. There is a water closet, and a sludge tank for dish-water and sewage can be installed under the house for use when parked in some place too pretty to despoil; there is an adequate galley or kitchen containing a sink with running water, a pantry for the storage of food, a bureau for nicknacks.

Every function of living has been accommodated simply, yet adequately so one can live, sleep and eat aboard this cruising cabin.

The factor on which the whole design hinges is the chassis. We use an old Model T Ford chassis as they are the easiest of all old auto frames to

procure, and as well are notoriously long lived and free from wheel trouble. Also the tires are dirt cheap.

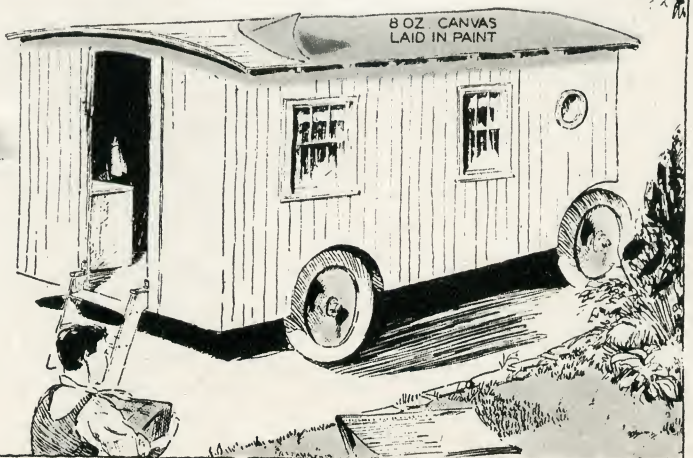
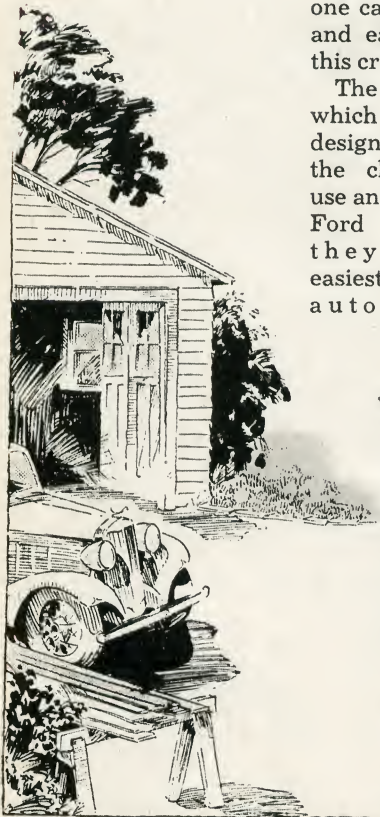
The best way to work is from the ground up, and the first thing to tackle is the conversion of the trailer.

The building of the body or cab is simple as we have designed it, but the matter of underslinging a Ford chassis is a horse from another stable, and therefore let's go into this more important end thoroughly.

As shown in Fig. 7, top, the Ford channel frame is 23 inches wide. It is four inches higher at the rear than at the front. Also the frame proper is way up in the air, far too high to allow us to put on a cab body with nearly full six-foot headroom unless we lower it.

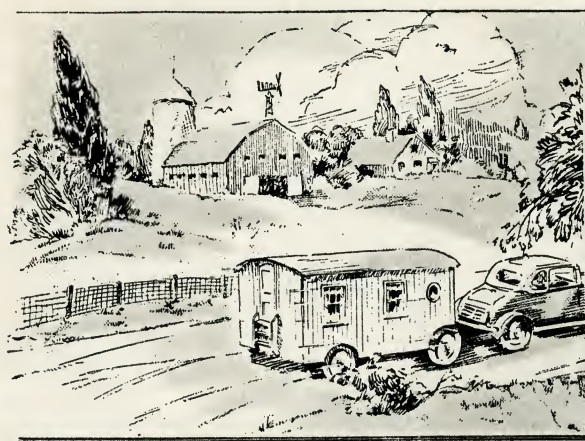
Make strap spring shackles for the rear end as the drawings show. Any blacksmith can do this for you for very little money if you don't have the facilities yourself.

The idea here is to get the shackle long enough to let the whole frame down so it is level. The wheels are mounted into the new spring perches, see Fig. 3, and the radius rods



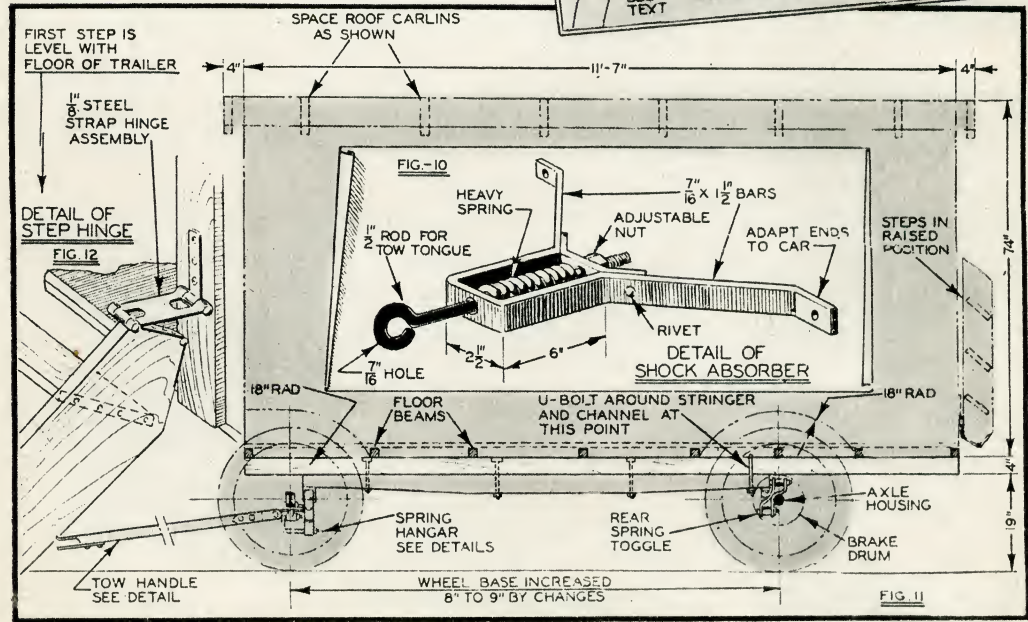
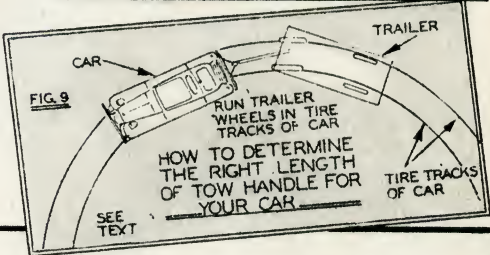
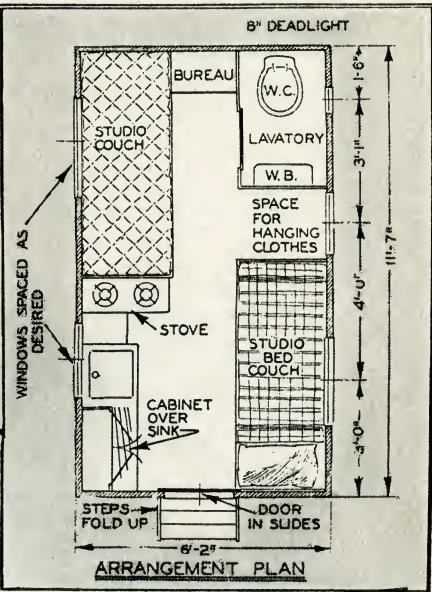
Constructed on a chassis salvaged from a Model T Ford this trailer solves the sportsman's problem for a suitable rolling cabin for camping use. Although trailers following this construction are outlawed for touring use they can, nevertheless, be licensed for towing to a temporary location. The trailer cabin is constructed from oak stock. Paneling is wallboard or artificial leather.

Cabin For SPORTSMEN



heated with a welding torch, bent, and re-seated. This takes care of the rear end, just as simple as that. See Fig. 8.

The front end underslinging is not hard the way we have it doped, either. See Fig. 3. Remove the front axle from the spring. Turn it around, end for end. This now places the steering tie rods forward. Bore out the taper seats on the present spring perches, and re-bush the old ones so they have parallel shanks, and bolt them upside down.



Cabinette's interior arrangement is shown in the upper right-hand illustration. Although shown with two bunks, upper bunks can easily be installed to meet your requirements. The coupler is constructed according to the bottom plan from heavy strap iron.

Ford T CHASSIS Forms "Cabinette's" Foundation

Then comes the only little piece of fussing you are put to in doing the job. You must secure some Chrome molybdenum rod out of which you can make the new U shackles

for the front spring. This part is highly stressed and nothing but Chrome moly will be safe. Plymouth rear spring shackles can be adapted, or a hardware

store can order for you what you need.

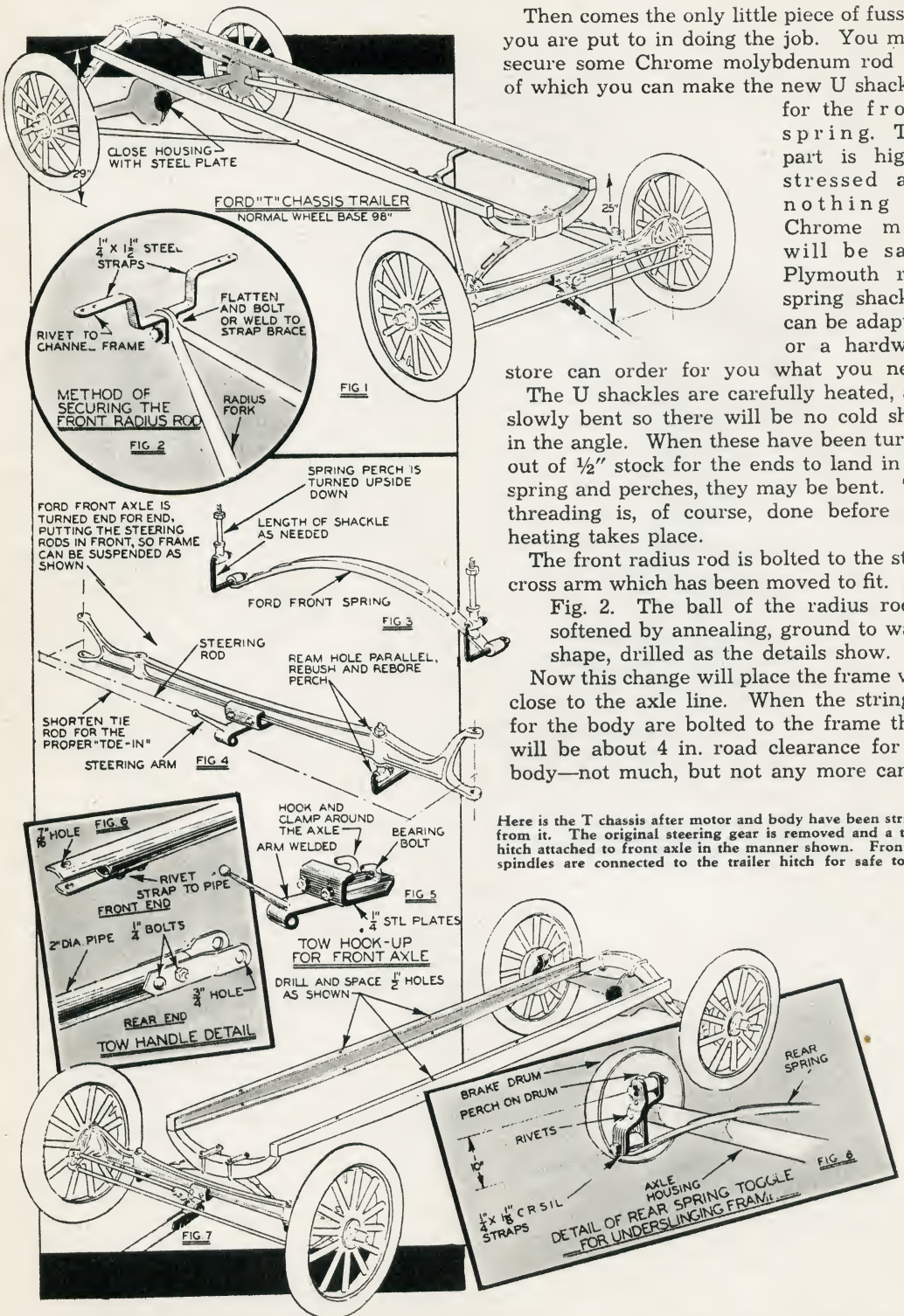
The U shackles are carefully heated, and slowly bent so there will be no cold shuts in the angle. When these have been turned out of $\frac{1}{2}$ " stock for the ends to land in the spring and perches, they may be bent. The threading is, of course, done before any heating takes place.

The front radius rod is bolted to the strap cross arm which has been moved to fit. See

Fig. 2. The ball of the radius rod is softened by annealing, ground to wafer shape, drilled as the details show.

Now this change will place the frame very close to the axle line. When the stringers for the body are bolted to the frame there will be about 4 in. road clearance for the body—not much, but not any more can be

Here is the T chassis after motor and body have been stripped from it. The original steering gear is removed and a trailer hitch attached to front axle in the manner shown. Front axle spindles are connected to the trailer hitch for safe towing.



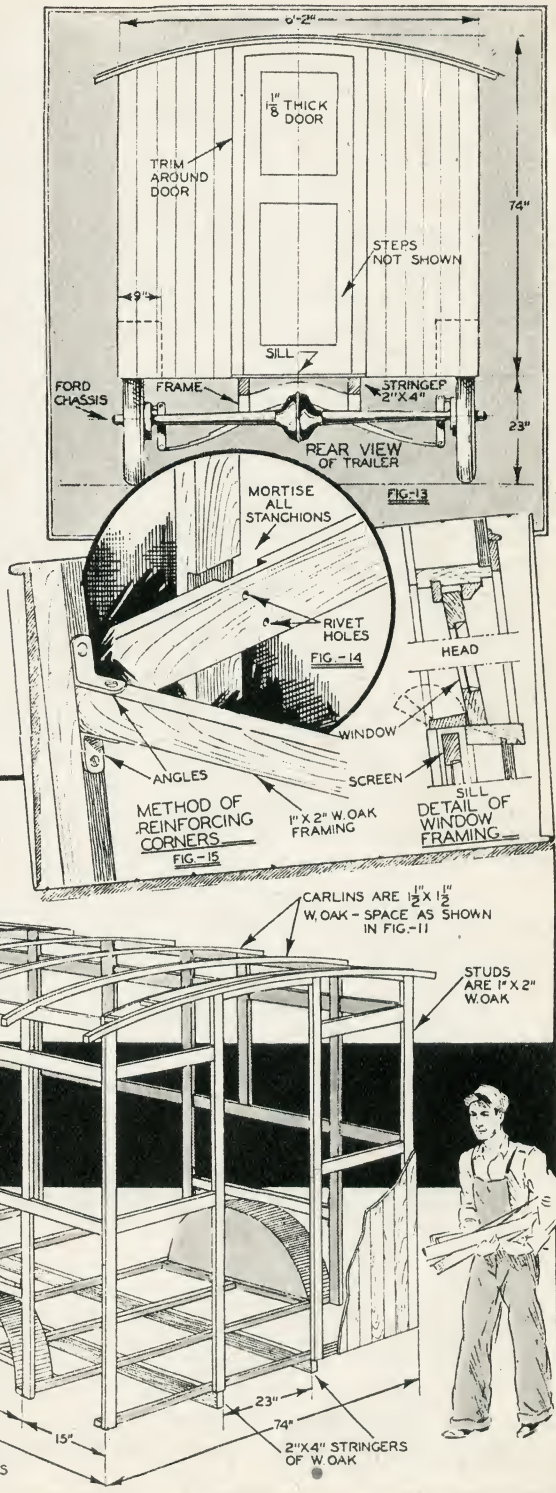
Trailer Is Paneled With Leatherette or Wallboard

done with this item; remember this is an adaptation, and we have to take the best we can get out of circumstances which are beyond our control. This one little point is the only thing where the whole design could be criticized. If one does not travel too fast over rough ground there will be no trouble. All rough corners should be taken easily, for it does not matter whether the axle comes in contact with the stringer as long as it is done gradually. On paved or gravel roads you can bounce along merrily.

The front tie rod will have to be shortened so that the wheels have the proper amount of "toe-in." Measure the distance between the wheels on the outside and inside, back and front, and shorten the tie rod with a welding torch until the wheels track as they did before the axle was turned end for end.

This point is highly important. If you do not do this, towing the trailer will amount to the same thing as trying to drive an auto backwards at high speed.

The above diagram shows the frame construction for the *Cabinette* trailer. Although beaded cedar is suggested for paneling, leatherette, chicken wire or wallboard is suggested so as to reduce the trailer's weight to a minimum. Top is covered with canvas.



Cabinette Not Intended For Travel Use

It will wreck the trailer and throw it out of control.

For steering, a special kind of trailer hook-up is made. See Figs. 4, 5 and 6. The drawings show how a plate of $\frac{1}{4}$ " wrought iron is bent around the axle, and secured with two $\frac{1}{2}$ " hook bolts which can be made by any blacksmith.

A $\frac{3}{4}$ " hardened steel pin is run through the towing tongue and this plate. It forms the pintle through which the towing and turning stresses are focused. It therefore must be this heavy, and be hardened.

The tongue itself is of pipe. Two-inch pipe will do. An alligator mouth is sawed in one end, and a piece of hardened strap is riveted on the end. If the pipe is left top and bottom to carry the load it will soon chew off and you are in danger of losing your trailer. With a piece of hardened strap on the tongue you know that can never give way.

The strap for the tongue makes this a universal joint, and it is stiff enough for towing and steering. An ideal arrangement, and it has proven itself on several hauls of over three hundred miles in length already.

With these changes made, you are ready for the body, but I have one more word to offer.

About the tongue length: Every car has its own turning radius, and so does a trailer. The two must have a tongue of just the right length, otherwise both towing and corner-taking will be erratic and hard on tires. Instead of turning the corner the trailer will be dragged around it, and the whole thing is unscientific.

The way to get the right trailer tongue is to take your car to some airfield, or other wide place where there is dust enough to see the tracks. Cramp the wheels and run the car in as tight a circle as it will go.

This will make tracks as shown in the drawing, Fig. 9. Now bring on the trailer. Run it right in the tracks of the car on the same curve. When it approaches the car to the point where the tongue, either real or projected in an imaginary line, hits the towing bar, there is your tongue length. Anything different will result in difficult, wasteful towing. Fig. 10 shows a shock-absorbing tow hook-up to be placed on the car itself.

Now the body can be put on the trailer, with the underslinging and the towing arm made ready. White oak stringers, 2"x4" are

used to mount the body on. These are bored and countersunk for $\frac{1}{2}$ " carriage bolts which go right through the frame. See Fig. 11. The last one toward the rear must be a U bolt going around the stringer, as there is too much weight hung cantilever at that point to risk cutting the stringer through for a fastening.

On these stringers are bolted, with quarter-inch carriage bolts, the floors, of 2x2 white oak. On these floors is laid $\frac{3}{4}$ " t & g fir flooring. In laying out, allow 9 inches wheel box space, and shorten the flooring and the floor beams at this point accordingly.

With the floor built upon the trailer, the side framing and end framing are put up. See Figs. 15 and 16. The framing for such a body is simplicity itself, and the drawings specify all the required sizes of 1"x2" white oak stanchions, into which are mortised window clamps and roof beam clamps. See Figs. 14 and 15. These clamps are all fastened with two quarter-inch carriage bolts at each mortise, and are tied with cool rolled 16-gauge angle plates at the ends.

Always use bolts in this type of construction, and rivets where specified. Use no screws. They work loose.

The roof beams are steam bent, and it is suggested that you let your local blacksmith attend to this matter if you cannot handle the work as he is apt to have a steam box for bending felloes.

Otherwise they can be cut to the crown of 6" in 6 ft. on a bandsaw, though this entails slight waste.

The roofing is of ordinary $\frac{1}{2}$ "x4" beaded cedar ceiling. This as in box car practice is nailed on with galvanized shingle nails. Canvas laid in paint and turned down with proper half round molding at the edges is used.

The sides are ceiled with any good wall-board or if you want a real neat job, you can lay chicken wire over the frame work, pad it a little and use Fabrikoid as a covering, though this is somewhat expensive.

The windows are spaced as shown, and a detail shows how both frames are cut for accommodating screen or window panes at once. Right hand drawing, Fig. 15.

The door in the rear end is sliding, made of a panel of $\frac{3}{4}$ " fir with plywood panelling. It slides instead of swinging, as swinging doors jamb, and take a lot of room. Don't use the 1 $\frac{1}{8}$ " door shown on the drawings.

Novel Trailer Eliminates Cabin Rent

The putting on of the ceiling will complete the body, and the trailer is now to be painted and furnished.

The matter of beds is one which was given a lot of study, and it was decided that the best thing would be to use the type of bed known as studio couch, which can be had at any furniture store for less than 20 dollars completely equipped.

These are best disposed as the layout shows in the arrangement plan. Up in the right hand forward corner, a small closet is made to accommodate a water closet of the light, cheap kind, and also a folding wash basin with drain to a water boiler which is slung below the chassis. The boiler can be equipped with a valve so that after breaking camp one can drive to some side road for a minute, and open the valve, disposing of the sewage off to one side of the road. This will be found efficacious and unobjectionable and well worth the trouble.

A water storage tank, in the form of a hot water boiler cut in half is hung above the sink, and piped to the water closet, to the wash basin and to the sink. An outlet tap and a hose are carried, and at any filling station the

hose can be connected, the tank filled, and you can be on your way.

The matter of clothes storage is important, and if disposed as shown you will have room for guns, hunting equipment, or traps as well as for your store clothes and Sunday Go to Meetin'.

The pantry doesn't have to be large in a thing like this. Only the staples are needed, and you'll find you'll be buying nearly as many meals as you get yourself.

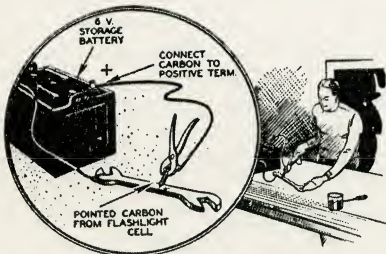
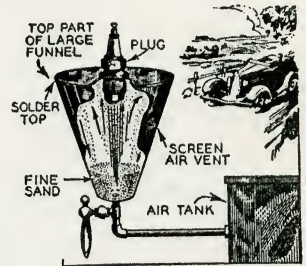
A two-burner stove of the four dollar kind is more than adequate to heat and cook with and a pail and a mop and a broom complete the job. You are ready to move in, hook up and be off to the lake, or the mountain, and have no hotel bills!

Cabinette was designed solely for use as a location trailer and is not intended for tourist use, therefore its construction is not advised if you desire a trailer which you can use for traveling about the country.

While in many states a four-wheeled trailer is outlawed, due to the fact that it is difficult to handle in traffic, a special license for towing *Cabinette* to your favorite camping spot can be secured from your state motor vehicle department.

Sand Blast Funnel Cleans Dirty Spark Plugs

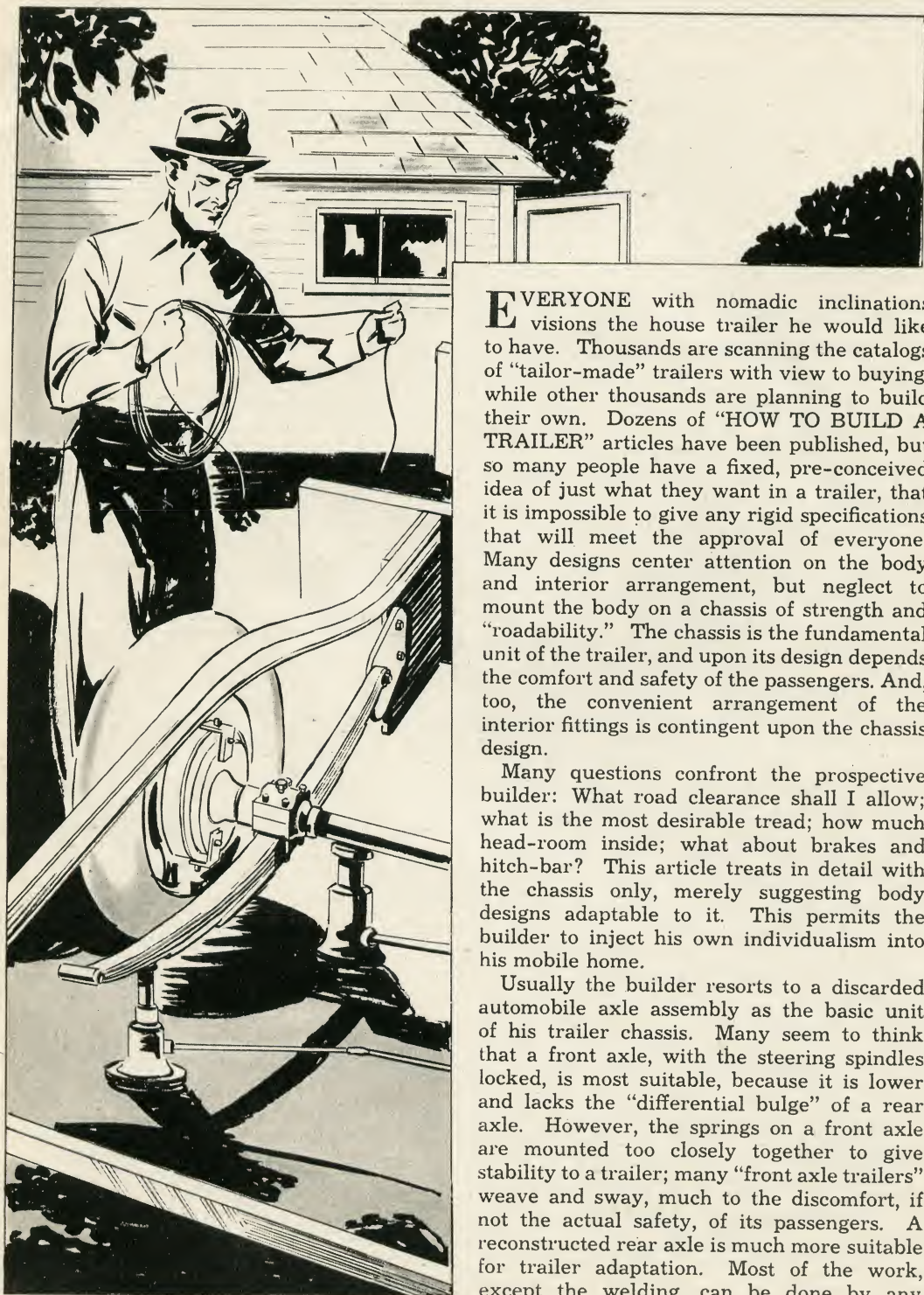
IT IS generally a long, tedious operation to clean spark plugs in the usual manner whereby the carbon deposits are scraped off with a knife—and the inside of the plug cannot be thoroughly cleaned unless the porcelain is removed. A large size funnel is soldered to a $\frac{1}{2}$ " pipe leading to an air supply tank. Fine beach sand is placed in the bottom of the funnel to a depth of two inches, a flat metal disc soldered over the top, and a hole cut for the plug. A rubber gasket glued around the hole insures a tight fit as the plug is held down for cleaning.—Bob Poulson.



Electric Arc Pencil Brands Tools

BY USING this electric arc pencil any tool, no matter how hard, can be marked as easily as if with pen and ink, yet permanently. Remove the small carbon pencil from a flashlight cell and grind to a sharp point at one end. This carbon can be held in pliers which are connected to the positive terminal of a 6-volt storage battery, or a special holder can be made up. Ground the tool being marked to the negative battery terminal.—Ben Branch.

Designing Your Trailer's Brake

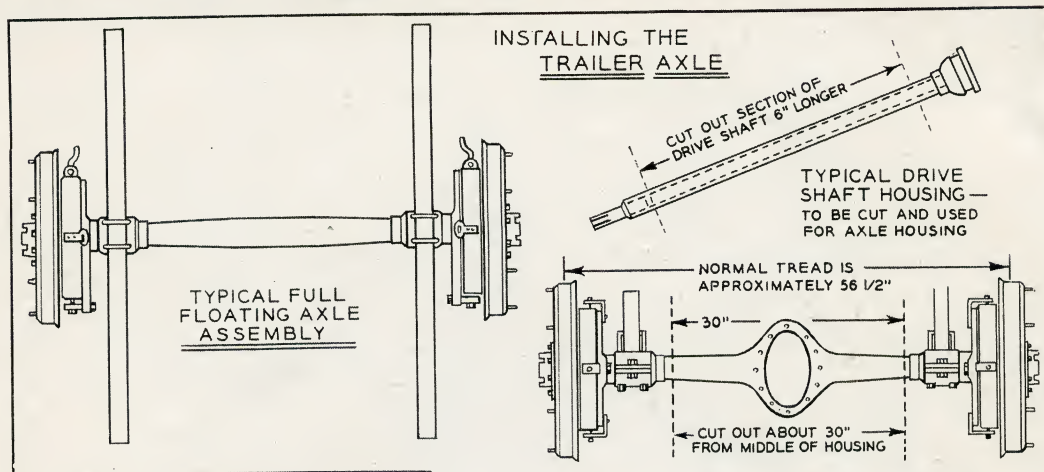


EVERYONE with nomadic inclinations visions the house trailer he would like to have. Thousands are scanning the catalogs of "tailor-made" trailers with view to buying, while other thousands are planning to build their own. Dozens of "HOW TO BUILD A TRAILER" articles have been published, but so many people have a fixed, pre-conceived idea of just what they want in a trailer, that it is impossible to give any rigid specifications that will meet the approval of everyone. Many designs center attention on the body and interior arrangement, but neglect to mount the body on a chassis of strength and "roadability." The chassis is the fundamental unit of the trailer, and upon its design depends the comfort and safety of the passengers. And, too, the convenient arrangement of the interior fittings is contingent upon the chassis design.

Many questions confront the prospective builder: What road clearance shall I allow; what is the most desirable tread; how much head-room inside; what about brakes and hitch-bar? This article treats in detail with the chassis only, merely suggesting body designs adaptable to it. This permits the builder to inject his own individualism into his mobile home.

Usually the builder resorts to a discarded automobile axle assembly as the basic unit of his trailer chassis. Many seem to think that a front axle, with the steering spindles locked, is most suitable, because it is lower and lacks the "differential bulge" of a rear axle. However, the springs on a front axle are mounted too closely together to give stability to a trailer; many "front axle trailers" weave and sway, much to the discomfort, if not the actual safety, of its passengers. A reconstructed rear axle is much more suitable for trailer adaptation. Most of the work, except the welding, can be done by any

and Spring Suspension System



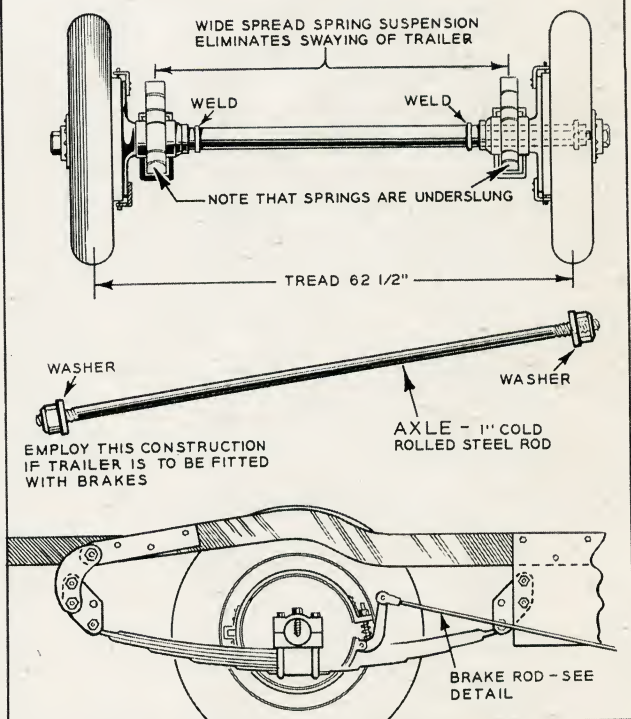
amateur mechanic with a hacksaw and application of "elbow grease."

For a couple of dollars, any auto wrecking yard will yield a rear axle housing assembly with wheels, bearing, brakes and original springs; also a tubular drive-shaft. The axle housing must be of the full floating type. In this type the wheel bearings are mounted on the end of the housing and the driving axles can be withdrawn without disturbing the bearings. This design is typical of old Cadillacs, Buicks, Reos, Packards. An old Cadillac axle is especially recommended.

With the aforementioned parts at hand, we'll start work. First cut out the middle section of the axle housing, and a section from the tubular drive shaft 6" larger than the cut-away section of housing. Here is where the "elbow grease" is expended, but a couple of hours with sharp blades will do the job. Illustrations show how the drive-shaft section has supplanted the differential section of the housing, and is held temporarily in place with the 1" rod passing through the assembly. In this condition it can be towed to a welding shop for welding. Of course the rod remains a permanent fixture.

It will be noted in the reconstruction that the springs have been underslung, and the

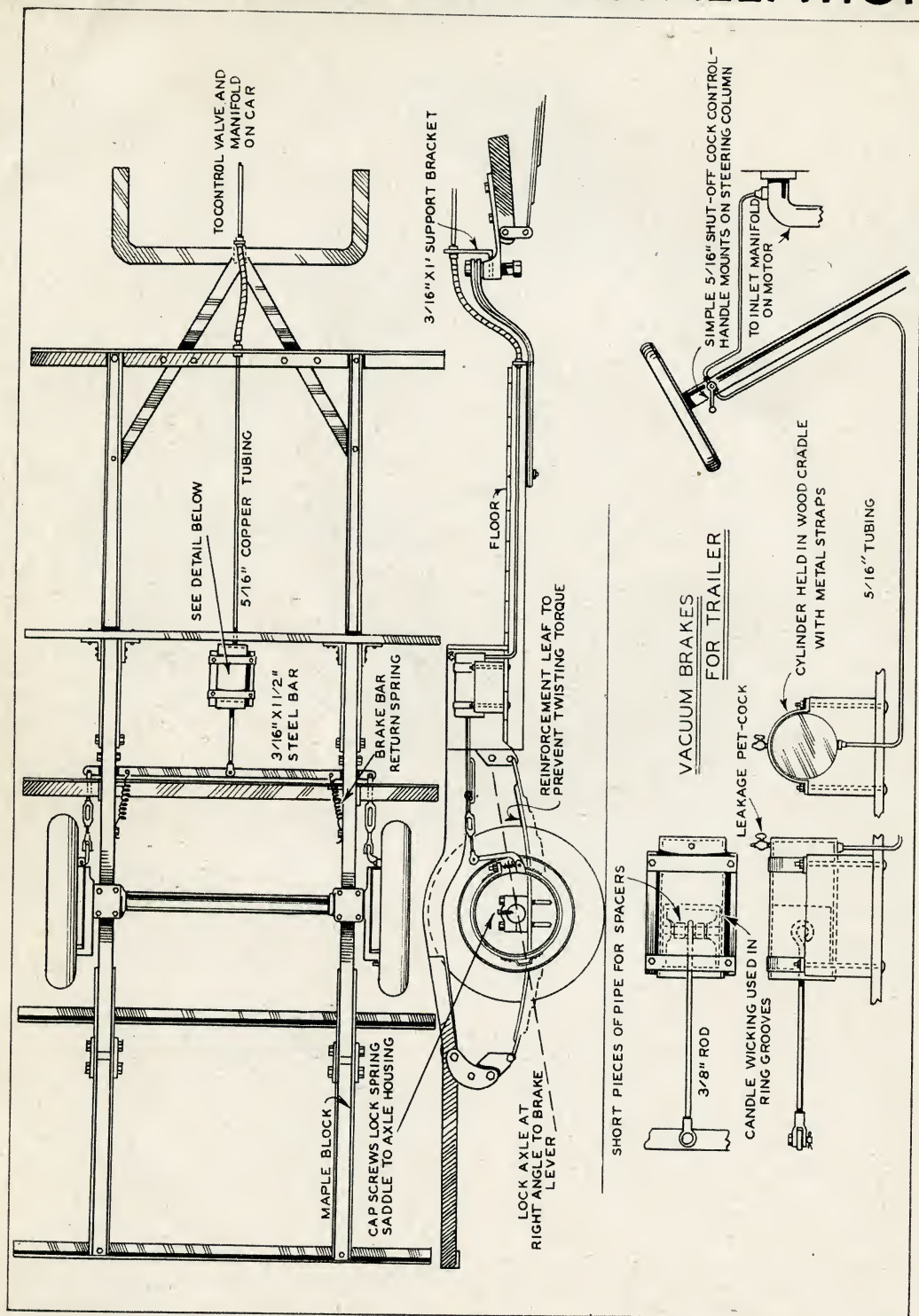
The above cross-section plan shows full floating axle assembly. This unit in complete form can be salvaged from a junked car and installed under your trailer chassis with little difficulty.



Since no torque rod is provided here an additional heavy spring leaf should be inserted over master leaf to reduce strain. To accomplish this draw saddle caps securely to trailer axle.

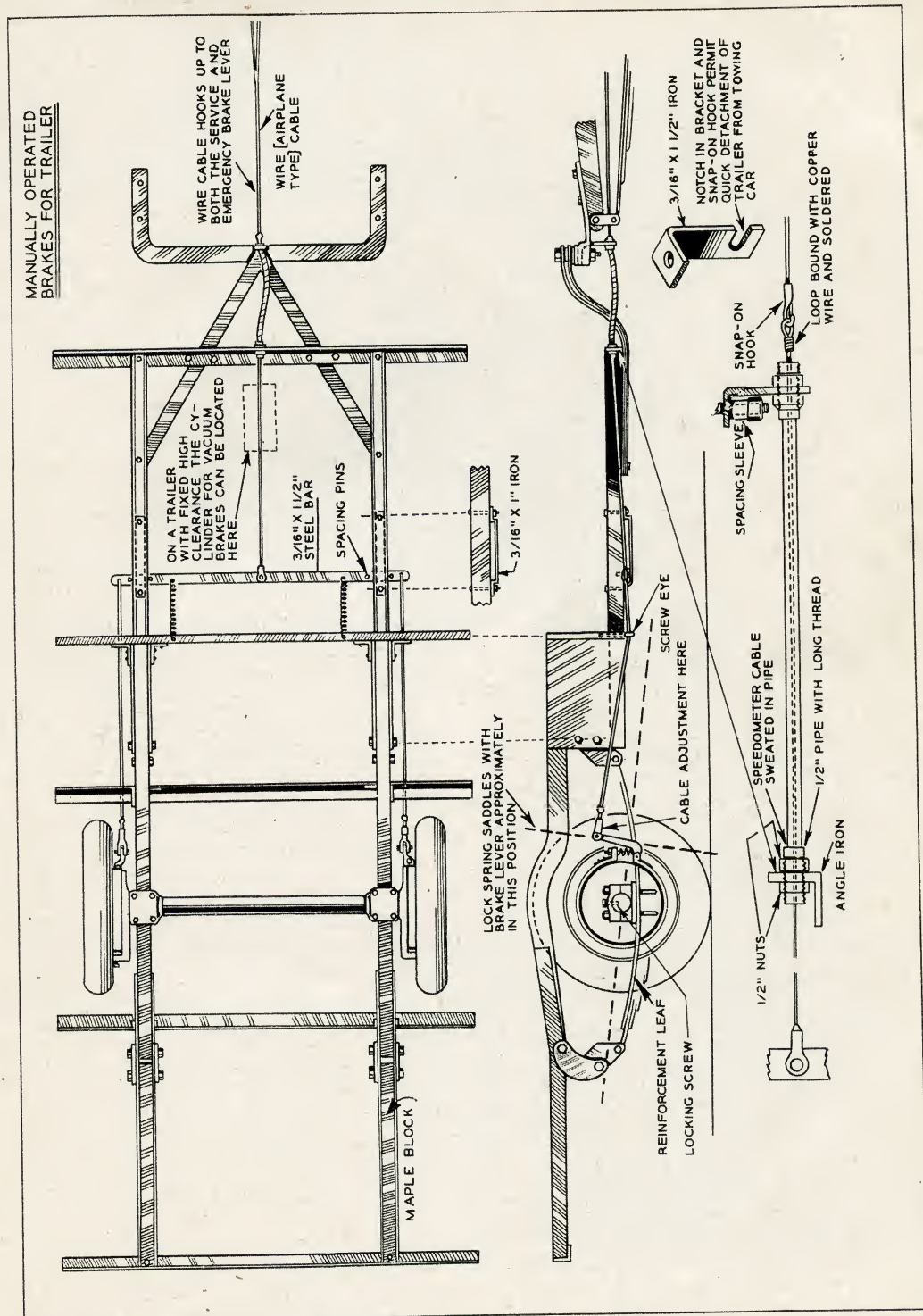
tread increased to about 62 1/2". This adds 6" to the width between the wheel housings inside the trailer itself, a point which will be

Plan Shows Vacuum Brake INSTALLATION



Any auto wrecking yard will yield the necessary materials for a very practical trailer axle assembly, including wheels, brakes and springs. Old Buicks, Reo, Packard and Cadillac parts are especially suitable for this purpose. The above diagrams show how a practical vacuum braking system can be installed on your trailer chassis. Any amateur mechanic can install the brakes.

MANUAL Brakes Also Suitable For Trailers



If desired your trailer can be fitted with this novel mechanical braking system. Like the vacuum system, this can also be salvaged from a junked car provided the parts are in good condition. A flexible steel cable connects from the trailer brake to the car's service and emergency brake pedal. Careful adjustment is important, otherwise the car may stop before trailer brakes take effect.

GOOD BRAKES ADD To Trailer's Safety

appreciated by anyone who has had a trailer built on standard tread of 56½".

The brake plans exemplify a point which must be considered if trailer is to be fitted with brakes—and it should be if used in mountainous country. Since there is no torque rod to resist the twisting torque of the housing, the springs must do the job. So an additional heavy spring leaf is mounted above the master leaf, and the spring saddles are made rigid to the axle housing. This is done by drawing the saddle caps tightly to the axle and securing them in position with ¾" cap-screws through the saddle cap and axle housing. The relative position of the brake-bands must be considered before locking the spring saddles, so leave this job until ready to fit up the brakes.

The compound spring shackles shown in the accompanying plans will probably have intrigued the trailer builder. We're coming to that now. The general assembly of the frame is quite obvious. The extensions and cross-members are bolted in place ready for welding.

Here is the solution to the trailer clearance problem. For long trips on surfaced highways the center of gravity is low and clearance only 7" permitting limit speed with safety and comfort. In five minutes' time, with only a pack and open-end wrench, the clearance can be boosted to 12½" for water-washed mountain roads and rutted roads of the Mid-West. This is made possible with the compound spring shackles. The notations on the drawings make all the details of construction quite obvious.

It will be seen that the chassis provides for two floor levels. Full standing head-room is allowed in forward part, which will contain the kitchenette, sink, wash basin, etc. Full standing head-room is not essential in the rear part, which will constitute the sitting-bedroom part of trailer. This feature makes a low roofed trailer possible without sacrificing comfort.

The draw-bar and hitch-bar are particularly recommended for this trailer chassis. Any blacksmith familiar with auto spring work can make these up cheaply. The holes in the hitch-bar must be laid out symmetrically so that the bar can be turned over to adapt itself to the variable trailer clearance.

It is a simple matter to fit your trailer with vacuum brakes. Little explanation need be

added to the notations on the drawings, except, perhaps, to explain the purpose of the pit-cock on the vacuum cylinder. If there were no leakage at all into this cylinder, a vacuum condition would be created equal to the vacuum in the manifold regardless of how much the control valve on the steering column was open. Furthermore, the pit-cock releases the vacuum in the cylinder after the control valve has been closed. The exact opening of pit-cock must be determined by experiment. Of course, the car motor must be idling, or being used as a brake doing down hill, to build up the maximum vacuum in the manifold.

If one so chooses, manually operated brakes can be fitted to the trailer, as depicted in the manual brake plans. These will be found to be highly practical and can be hooked up with either the front brake or emergency brake of the touring car—or to both. The latter hook-up, though, is recommended. If the clutch pedal of the car has a wide range of movement after the clutch has been released the trailer brake can be connected to the clutch pedal so that, in an emergency, braking effort can be applied with both feet.

No body design is suggested for this chassis arrangement since no two people have the same ideas as to how their trailer should be designed. By careful planning there is no reason why this system cannot be used with any one of the trailers described in this book. In fact, the brake and spring suspension can very easily be incorporated into the original chassis design of the various trailers provided the arrangement is planned carefully before any actual construction work is started.

TRAILER BLUEPRINT PLANS

Blueprint plans for building any of the trailers described in this book are available, printed on tough rag content paper. A three-cent stamp will bring you a copy of the latest Modern Mechanix Blueprint Catalog describing one hundred and twenty-five workshop projects.

MODERN MECHANIX PUBLISHING CO.

Fawcett Bldg.

Greenwich, Conn.

MICRO-TEST YOUR CAR'S CYLINDER OIL

WHEN the average driver looks at his speedometer and notes that it's time for his regular oil change, he usually wonders whether, after all, his oil really does need changing. Unfortunately, he has no final check other than the word of the service station attendant.

The result is that his oil is often changed long before it is necessary, or it is left in the crankcase far too long.

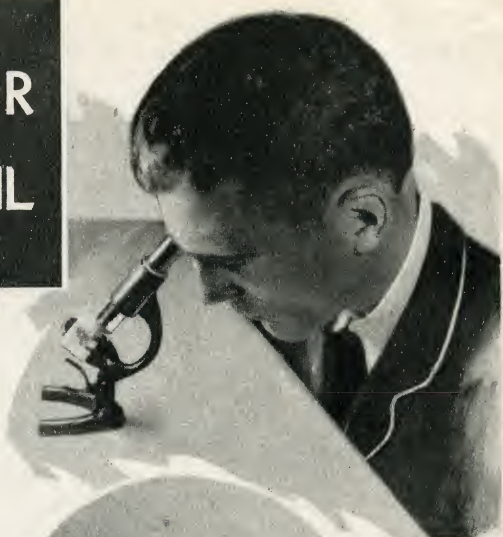
There is a simple, sure method of *seeing* just what the condition of your oil is. All the equipment necessary for this experiment is a few strips of blotting paper and an inexpensive microscope. A microscope which has a magnification of twenty-five diameters is sufficient.

The idea is to convert the microscope into a semi-dark field instrument. This is done by substituting a strip of white blotting paper, about 1x3 inches, for the conventional glass slide.

The movable mirror is not used for directing the light, the lighting comes from above the object being examined. An ordinary gooseneck lamp will serve very well as a source of illumination.

Remove a drop of oil from the crankcase. Place it on a strip of blotting paper and note how rapidly it spreads. This is a good test of the amount of gasoline dilution. Now place the strip in the microscope, and adjust the light so it strikes the paper and reflects into the microscope.

As the oil sinks into the blotting paper it leaves the carbon and metal fragments on the surface. The strong side lighting brings these into sharp relief. The metal particles gleam, while the carbon shows a dull black. A good check on the amount of carbon in the head and on the valves may be made in this manner.



Checking the amount of foreign matter in automobile cylinders requires only an inexpensive microscope set up as shown here.



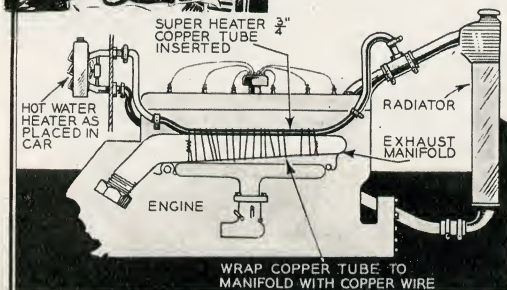
Right—Oil saturated blotter before oil had been placed in crankcase. Top picture shows particles of foreign matter in oil after used.



Samples of oil for making this interesting test can be removed from any car simply by pulling out the oil level gauge and applying a drop of oil to a piece of white blotting paper. Oil containing impurities will sparkle.

TIPS FOR MODERN MOTORISTS

Tubing On Manifold Helps Car Heater

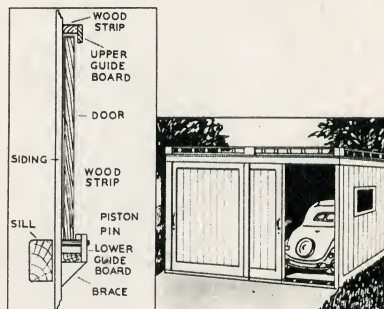


THE temperature of the average automobile heater very seldom is sufficiently high for driving in cold winter weather due to the amount of hot water tubing exposed to the cold blast of air produced by the momentum of the car and the fan.

The temperature of the average hot water heater can be raised considerably by replacing the original tube that connects to the radiator coupling hose with a length of copper tubing. Fasten the copper tubing to the manifold with copper wire wrapping a layer of asbestos paper over both if you desire the maximum amount of heat.—William Tatina, Chicago, Illinois.

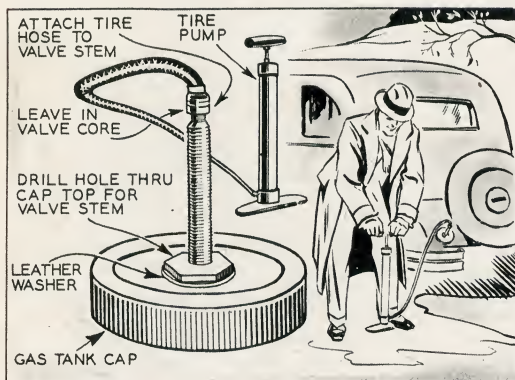
Piston Pin Makes Garage Door Roller

PISTON pins which have been taken from a salvaged car make good rollers for use on garage doors. The doors are mounted between guide strips with the piston pins fastened in place with large lag screws. Where the garage is provided with a concrete floor the rollers may be installed in a track in the garage floor so as not to interfere with the car's entering and leaving. The rollers will provide easy garage door operation.—Curtis Wilson, San Antonio, Texas.



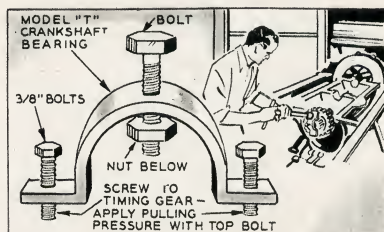
Valve Aids Winter Starting

MUCH of the disagreeable trouble experienced in starting a car in cold weather can be eliminated with a replacement gas tank cap and an old inner tube valve and stem insert. Drill a hole large enough to pass the valve stem and then attach the cap to the gas tank. Connect a hand pump to the stem giving it about a dozen strokes with both choke and throttle controls pulled out to maximum. Now step on the starter, allow the motor to make a few revolutions and push in the choke.—Q. G. Biegert, Junction City, Kan.



Wheel Puller Made Of Old Bearing

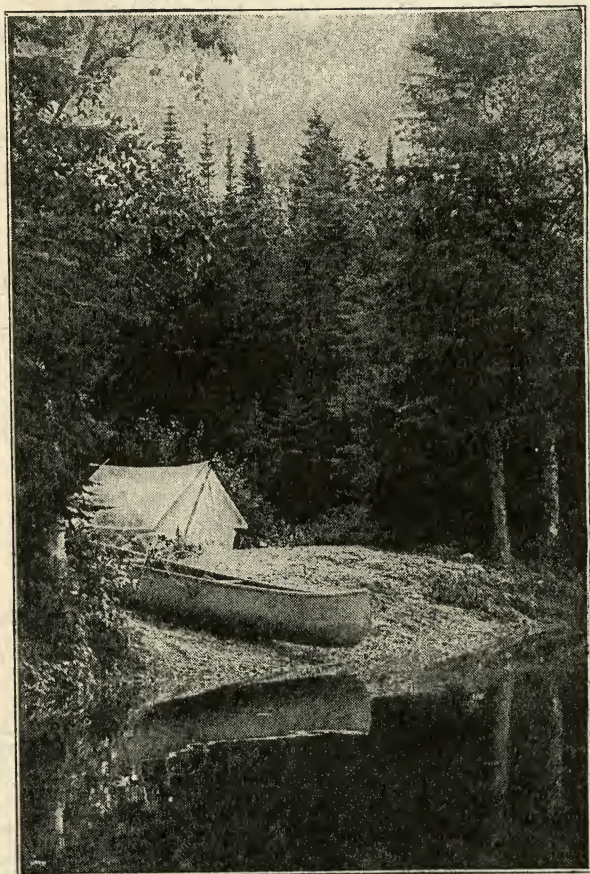
BY DRILLING a hole through the center of the cap of a model T connecting rod bearing and inserting a bolt and nut as illustrated a strong timing gear puller can be constructed. Lodge $\frac{3}{8}$ -inch bolts in the gears through the outer holes of the bearing and apply the necessary pressure.—A. G. Kociyan, San Leandro, Calif.



SPORTSMEN'S Manual

HUNTING, FISHING
CAMPING, TRAPPING

A book packed with practical tested information on the entire realm of woodcraft. Clearly and concisely in pictures and text it tells how to hunt squirrels or the big game of mountains and forests; how to fish for sunfish or the giants of the ocean; how to enjoy short hikes in nearby woods or how to prepare for extended stays in the wilderness.



Edited by
ROBERT PAGE LINCOLN

RESERVE YOUR COPY NOW

50^c

*At your News Dealer,
or order directly from*

MODERN MECHANIX PUB. CO.
FAWCETT BUILDING, GREENWICH, CONN.



Your Favorite Hobbies



WHETHER you build boats, furniture, or cabin trailers—whether you hunt or fish—whether you enjoy stories about aviation, adventure, new inventions, or stamp collecting, you will find the newest and best articles on your hobby in each issue of

MODERN MECHANIX

15c a copy
at your Newsstand

By Mail
\$1.50 a year

